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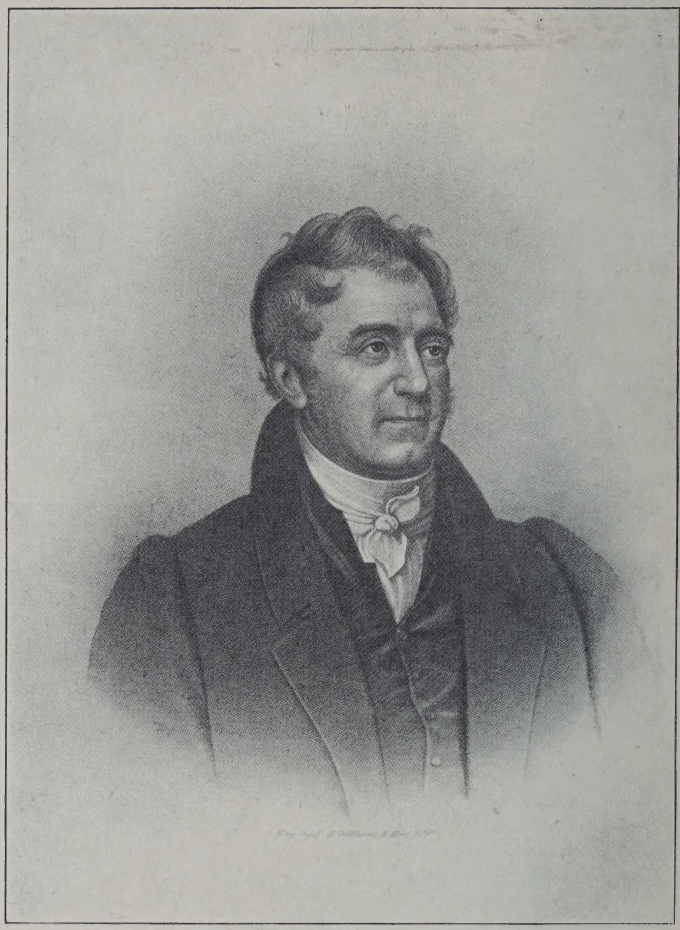
E. I. DU PONT DE NEMOURS AND COMPANY

A History



E. J. Dubost de Montaurus

E. I. DU PONT DE NEMOURS AND COMPANY

A HISTORY

1802–1902

BY

B. G. DU PONT

With Illustrations

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E. I. DU PONT DE NEMOURS AND COMPANY

CHAPTER I

IN the latter half of the eighteenth century there existed in France a body of scholarly men who were very earnestly trying to find some wise and reasonable method of political reform. They were in favor now with one party and now with another, but were always striving to avert the danger that they knew was very near, and to give their country some measure of the liberty that all nations were demanding. Perhaps their plans were not sufficiently practical; perhaps the financial problem was incapable of solution; perhaps the triumph of the American Revolution had swept away all political restraint in France; but the deluge foreseen by Louis XV was on them before they were ready, if they ever could have been ready, and in the struggle between the King's party and that of the people these men of moderate opinions were probably the worst sufferers.

During the Reign of Terror many of them were imprisoned or executed, and almost all of them who lived through that fearful year were forced to leave the country that had so ill rewarded their efforts.

Among the "Moderates" who would have been guillotined but for the fall of Robespierre was Pierre Samuel du Pont de Nemours. He was a man of profound philosophic and literary attainments and the author of many treatises on political economy. He had been a pupil of Quesnay, a friend and valued assistant of Turgot and other Ministers of Finance, and his help had been sought by the rulers of other countries. He held the office of Counsellor of State when he was elected by the district [1] of Nemours to the newly convened States General. He was at different times president and secretary of the Constituent Assembly, where he took an active part among those who hoped for a constitutional monarchy. He and his younger son [2] were with the few who fought in defence of the King on the memorable 10th of August. Unfortunately his efforts for moderation won for him the ill-will of the Jacobins; he was imprisoned in La Force during July and

[1] *Bailliage.* [2] E. I. du Pont.

August, 1794, and was saved from the guillotine only by the death of Robespierre. In 1795 Du Pont de Nemours was elected deputy to the Council of Ancients, of which body he was for a time president. He attempted to add to his diminished income by establishing a printing-house in Paris, where were published, beside various memoirs and books of travel, many political pamphlets and a paper, "L'Historien," representing his own political views. Again he attacked the policy of the Government, his paper was suppressed, and in September, 1797, he and his younger son were imprisoned in La Force and he narrowly escaped deportation to Guiana.

Du Pont de Nemours had always been keenly interested in the Government and people of the United States. He had, with James Hutton, made the preliminary draft of the Treaty of 1783, by which England recognized the independence of the American States. Franklin and Jefferson were his friends, as were Lafayette and Talleyrand. His elder son, Victor du Pont, had lived in America in various diplomatic and consular positions for over ten years and liked the country. Life in France was becoming more and more difficult; his patriotic

efforts had exhausted the greater part of his fortune; and he and his sons came to believe that their best hope for success was by emigration.

The enormous tracts of undeveloped land in America seemed to offer great opportunities for investment. In 1792 a pamphlet was printed in Amsterdam, entitled "Réflections offertes aux capitalistes de l'Europe, sur les bénéfices immenses que présente l'achat de terres incultes, situées dans les États-Unis de l'Amérique." In that same year an association of Dutch capitalists, who had loaned large sums of money to the American revolutionists, agreed to take about four million acres of land in the States of New York and Pennsylvania in payment of that debt, and called their new venture "The Holland Land Company." Before the end of 1800 they had spent about $400,000 more on roads, fences, and buildings of different kinds. Du Pont de Nemours was much interested in so great a plan of development, and determined, with the help of French investors, to form an association that he would himself direct with the assistance of his two sons and his wife's son-in-law, Bureaux de Pusy, who had been imprisoned at Olmütz with Lafay-

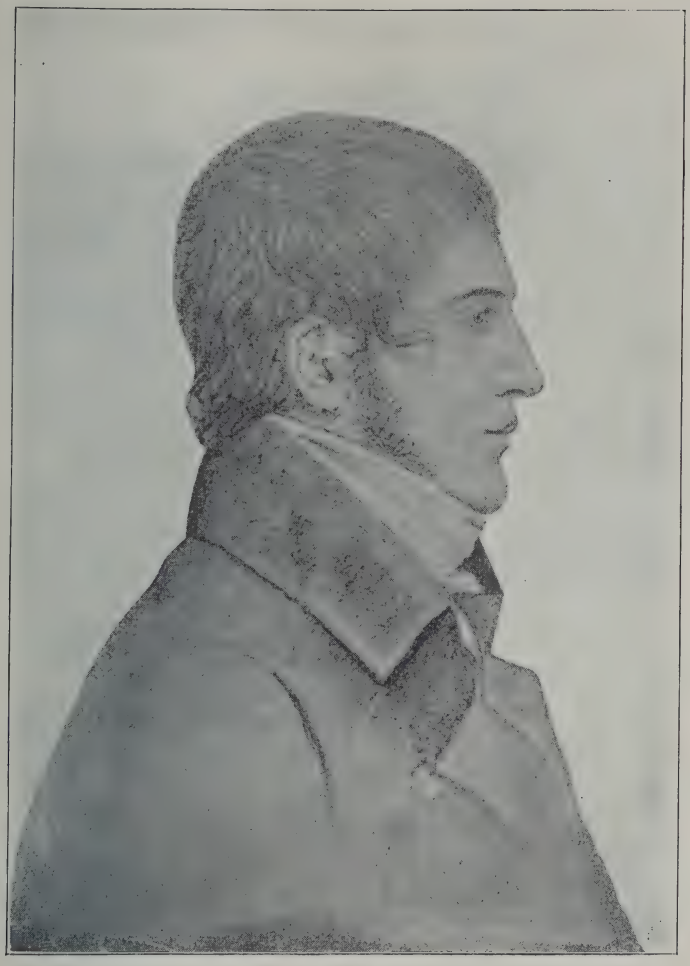
ette, and who, although released in 1797, was not permitted to return to France until 1800.

Du Pont de Nemours's plan was for a company of shareholders, with a capital of four million francs in shares of ten thousand francs each, for the purchase and development of land in the western part of Virginia, principally in the valley of the James River; for the establishment, also, of a central office in Alexandria, which town was being exploited as the seaport nearest to the new Capital of the United States; and for an office in New York, to be managed by Victor du Pont, who would do a banking and exporting business until their principal interest should become profitable. James Bidermann, a banker living in Paris, became much interested, and offered as part of his share six thousand acres of land that he already owned in Kentucky. In the spring of 1799 Du Pont de Nemours went to Holland and Belgium to find other investors and to give his instructions to Bureaux de Pusy, who in May sailed for America with his mother-in-law, Madame du Pont de Nemours, and his little daughter, to find a home near New York for the whole family. In the meantime Victor du Pont travelled in the south of France in

order to form business connections; and his brother, Eleuthère Irénée du Pont, undertook the necessary preparations for the journey and the sale of the printing-house in Paris. The little leisure time left to Irénée du Pont was devoted to the study of botany, which had always interested him. He evidently expected to use that knowledge in the development of their Virginia land, for his passport described him as a botanist.

Du Pont de Nemours soon had two hundred and fourteen shares subscribed for his land enterprise, with a very imposing list of names — Lafayette, Beaumarchais, Duquesnoy, Rousseau, Pourtalès, La Tour Maubourg, Necker were among them, but many of them never paid. Instead of the proposed 4,000,000 francs he received only 455,000, and of that 30,000 was lost in the failure of a Paris bank before he left Europe. Moreover, the vessel on which his wife and Bureaux de Pusy had sailed from Holland was captured by the English and held for four months, so that their part of the preparation in New York for the establishment of the business was not accomplished.

In September of 1799 Du Pont de Nemours decided that he could wait no longer for possi-



ÉLEUTHÈRE IRÉNÉE DU PONT DE NEMOURS AT TWENTY

ble subscribers and sailed in the ship American Eagle with his two sons, Victor du Pont, his wife and two children; Eleuthère Irénée du Pont, his wife and their three children, and his wife's brother, Charles Dalmas, a youth of twenty-two years; Madame Bureaux de Pusy, the stepdaughter of Du Pont de Nemours, and her baby. They were ninety-five days in crossing, and one of Du Pont de Nemours's biographers writes: "There was scarcity of everything, especially of water; the worn-out crew flew a flag of distress for almost half the voyage. Du Pont alone preserved his *sang-froid* and his gaiety; he entertained every one and amused himself by making verses; but, with his sword under his arm, he watched at night to see that the sailors did not do violence to the passengers."[1]

On the 1st of January, 1800 — it must have been a very happy New Year's Day for them — they landed at Newport, Rhode Island, and three days later continued their journey to New York where they met Madame du Pont and Monsieur de Pusy.

When he arrived in New York Du Pont

[1] *Notice biographique sur M. Du Pont* (Pierre Samuel). Par M. Silvestre; Paris, 1818.

received a letter from Thomas Jefferson, on whose friendship he had counted for advice about his investments, urging him on no account to buy land under the existing conditions. Prices were unreasonably high and would remain so for two years, perhaps longer.[1] Furthermore, aliens could not own land in many of the States and a residence of five years was requisite for naturalization in all of them except Virginia, where ownership of real estate was the only qualification. The company could arrange no importations of merchandise because the custom-house duties were ten per cent higher for aliens than for citizens. Consequently Victor du Pont, the only one of the directors who spoke English readily, bought a house in Alexandria, Virginia, and was naturalized a few months after their arrival.

As a result of so many disappointments, about one fifth of their capital had been spent by the autumn of 1800; it was imperative that investments should be found for what was left, even if the ultimate profit was to be much less than the shareholders were expecting. Du Pont de Nemours was never lacking in ideas, and he

[1] Statement made by Du Pont de Nemours to the shareholders of his company, April 18, 1808.

evolved many plans that seemed promising. He arranged for the exchange of cargoes with a friend in Guadeloupe; he offered to the Governments of France and the United States a plan for a regular passenger-boat service; he worked out methods of communication between Spain and the Governor of Mexico[1] that should escape the vigilance of the English Navy — England being then at war with Spain; and last, and presumably least important, he allowed his younger son to plan for the establishment of a manufacture of gunpowder.

In 1788, when a boy of sixteen, Eleuthère Irénée du Pont, whom his family called Irénée, but who came to be better known as E. I. du Pont, began the study of chemistry at Essonne, in the laboratory of his father's friend Lavoisier, who was then in charge of the manufacture of gunpowder for the French Government. So well was Lavoisier pleased with his pupil that his future was supposed to be definitely arranged as assistant and eventually chief of that manufacture; but the strictness and economy of Lavoisier's administration had made him unpopular, and his position was one of the first

[1] Mexico was a colony of Spain until 1821.

to be suppressed by the Revolution, in 1791. Lavoisier accepted a position in the Treasury, and Irénée du Pont, unwilling to remain in the Powder Department after his chief had left it, joined his father in the management of his printing-house in Paris.

Pamphlets and journals were issued broadcast at that time of popular excitement, and Du Pont de Nemours's presses were never idle. His father's imprisonment during the Terror threw all the work on Irénée's shoulders; he proved to be an efficient manager of men and affairs, and would probably have made a success of his new occupation but for the political purpose of his father's writings, which resulted in the temporary imprisonment of both father and son and the suppression of their principal publication.

Irénée du Pont, therefore, though only twenty-eight years old when he arrived in America, was a man of unusual training and experience. Through no fault of his own he had twice lost what had seemed to be a permanent occupation. He had no intention of throwing away either his little capital or his training by attempting to earn his livelihood by uncongenial work, yet it was imperative that he

should arrange for the support of his wife and children.

While he was in that very unsettled frame of mind he went for a day's shooting with Colonel Toussard, a friend of his brother Victor who had come to America with Lafayette and had stayed in the country. They shot away all their powder and bought a new supply at the nearest shop. The high price and bad quality of this powder impressed Irénée du Pont, and he easily interested Toussard, who helped him to learn all about the industry as it was carried on in America. Their information satisfied Irénée that there was a real opportunity for a powder manufactory built and managed on the plan of the French Government works. He made careful estimates of what he would need in money and machinery and went back to Europe in January, 1801, accompanied by his brother.[1] He was in France for three months and returned when his errand was accomplished, landing in Philadelphia about the middle of July. He had secured the money he thought necessary, or promises of it, and had ordered machinery in France. The estimates that he took abroad called for twenty-

[1] See Appendix, p. 167.

four thousand for the first cost of land, buildings, and machines, and twelve thousand dollars more for raw materials and successive payments on the land. Du Pont de Nemours was unwilling to take the whole amount from the capital of the original land company, but Irénée had little difficulty in interesting friends of his father in his own project; those who subscribed most largely were James Bidermann, General Duquesnoy, and Necker, a brother of the former Minister of Finance. Mr. Bidermann's share was partly used in France to pay for the machinery that Irénée du Pont bought with the advice and help of the chiefs of the Government Powder Department. This transaction is most interesting; the description and explanation of machinery and even offers of trained workmen to be sent to him in America were written on paper with the Government letter head; the machines were made at the Arsenal and the Government works at Essonne, and the drawings were made by Government draftsmen. In a country so entirely military as France had become, such consideration could hardly be merely the courtesy of former associates, and seems to be best explained by a letter that Irénée du Pont wrote to his father six

or seven years later: "It is the commerce of the English only that American manufacturers can hurt. In four years I have made 600,000 pounds of powder that would have come from England if I had not made it; therefore it is only the English that I have injured. This truth was well understood in France when I was given every facility for procuring my machinery." [1] Napoleon's efforts to destroy the commerce of England seem to have been most fortunate for the equipment of the American powder mills.

While Irénée du Pont was in Europe his father, at Jefferson's suggestion, had tried unsuccessfully to find a location for the mills near Washington. On his return Irénée went there himself, but found "no opportunity in Maryland or Virginia near Federal City; [2] the country, the people, the location are all worthless." [3] And he decided "to stay a day in Wilmington to see the Brandywine." [4] Probably his friendship with Colonel Toussard and Victor's with Alexandre Bauduy, both of whom lived near Wilmington, influenced him to visit

[1] E. I. du Pont to Du Pont de Nemours, October 1, 1808.
[2] Washington.
[3] E. I. du Pont to Du Pont de Nemours, September 19, 1801.
[4] *Ibid.*

that part of the country. Naturally he was also interested to meet the little colony of Frenchmen, all of whom urged him to make his home near them. But agreeable neighbors were only one consideration — the money promised in France had not all been paid, and as it was becoming evident that much of it never would be, more must be found in America. In the meantime his machinery was arriving from France and he had nowhere to put it. Irénée du Pont had tried to buy, from one William Lane, powder mills that for some years had been making rather bad powder at Frankford, near Philadelphia, but Lane refused to sell. Various locations were suggested, one at Rosendall on the Hudson River, another near Paterson in New Jersey; but the Bauduys were very eager that a site near Wilmington should be chosen, and Peter Bauduy, the brother of Victor du Pont's friend, was lavish with his offers of money and influence. He suggested two properties, one belonging to a man named Harvey; another farther in the country, belonging to Jacob Broom.

Irénée du Pont finally decided in favor of Broom's farm of ninety-five acres, the price of which was $6740. At that time, however, an

alien could not own land in Delaware, and in November of 1801 Du Pont de Nemours asked the advice of Alexander Hamilton, who offered to "consult Mr. Bayard of Wilmington, as being influential in Delaware, to find out whether it is possible during this winter session to obtain from the State a special act which, unless there is unreasonable animosity against the French, should not be refused to a large and valuable industry."[1] Apparently no such legislation was effected, for on the 27th of the following April the deed to the desired property was made in the name of William Hamon, a naturalized Frenchman living in Wilmington and friend of the Bauduys. Irénée du Pont's capital then consisted of his machinery, for which Bidermann had paid four thousand dollars in France; ten thousand dollars in cash — or rather, in his father's stock-company — of which two thousand was needed at once for the land; a cargo of salt supposed to be worth four thousand dollars, which represented General Duquesnoy's share; and Mr. Bidermann's promise of five thousand dollars more — a total of twenty-three thousand dollars.

[1] E. I. du Pont to Peter Bauduy, November 30, 1801.

CHAPTER II

1802–1804

SHORTLY after Victor and Irénée du Pont went to France in 1801, Bureaux de Pusy with his wife and child made the same journey, intending to go to Spain to arrange for Du Pont de Nemours's Spanish-American shipments, but when he reached France the treaty of peace between England and Spain was being drawn up at Amiens and the scheme was purposeless. He accepted a position under the French Government and never returned to America.

Victor du Pont's mission was not much more successful, as the French Government declined to listen to the packet-boat plan; but he made important acquaintances in Paris and came back to America four or five months later than his brother, believing that if he could establish a creditable commission house in New York, he could get from the French Government charge of all their financial affairs in America. During his absence the Guadeloupe trade arranged by his father had been

ended by a revolution in that island. The stock-company, which was known as Du Pont de Nemours, Father, Sons and Company, had spent one quarter of its capital and was without any definite plan for the future except an interest in the powder factory, for which as yet no site had been chosen.

A new difficulty then confronted the father and sons. Their corporation had been organized according to the laws of France for the formation of a *commandite* — a stock-company wherein each shareholder is responsible only for the amount he has invested. After his arrival in New York Du Pont de Nemours learned, what none of the investors had known before, that in America no such form of organization was recognized and no laws existed for the protection of his shareholders — that any one of them might become responsible for the entire indebtedness of the Company.[1]

Unquestionably the New York house was not doing enough business to employ both father and son, and if Victor du Pont's hope for financial relations with the French Government was to be realized one of them must be

[1] Statement made by Du Pont de Nemours to the shareholders of his company, April 18, 1808.

in Paris. While they hesitated, President Jefferson asked Du Pont de Nemours to assist the American Minister in his negotiations with Bonaparte and Talleyrand for the purchase of Louisiana. So important a mission could not be refused, and Du Pont and his wife returned to France in June, 1802. Before sailing he drew up a formal agreement with his elder son by which they established two firms — Du Pont de Nemours, Père et Fils et C^{ie}, the original stock-company, was, for the protection of its shareholders, to have its office in Paris and to be directed by Du Pont de Nemours. The second firm, V. du Pont de Nemours and Company, of New York, was nominally independent of the Paris house. Those firms were to hold eleven shares in the powder enterprise, valued at two thousand dollars a share — in other words, to find two thirds of the necessary capital. Irénée had disposed of three shares in Europe, and Peter Bauduy, who had just sold large properties in San Domingo, offered to buy two shares in the manufactory and to take an active part in its management; with this encouragement the success of Irénée's undertaking seemed assured.

As soon as Du Pont de Nemours and his wife

had sailed for France in June, 1802, Irénée made his own preparations for leaving New York. His brother-in-law, Dalmas, went first, in charge of dogs, sheep, boxes, and barrels, and a few days later Mr. and Mrs. du Pont and their children followed, arriving in Delaware on the 19th of July, 1802. Their home was a two-story log house on the land that Mr. du Pont had bought from Jacob Broom, four miles from Wilmington. The discomfort was very great, but he wanted to be close to his work, and in February of 1803 he wrote to his father: "We have accomplished an astonishing amount of work since August, but I am dismayed when I think of what is still before us. Within three months we have built a large house and barn of stone and the greater part of the refinery; we have repaired the water-course and the sawmill in which we prepare the wood for our frame-work, and a part of that used for the machines. This month we have still to build three mills and one or two other buildings; to dig a new race for one of the mills; to make the drying place, the magazine, the workmen's quarters. It is evident that we cannot make powder before the autumn." [1] To add to his difficulties

[1] E. I. du Pont to Du Pont de Nemours, February 7, 1803.

his family were not well, "the position of our little house at the very bottom of the valley and in the damp air of the creek is not a healthful one, but I think that when spring comes and we live on the hill I shall be quite strong again."[1]

The capital that was to serve as a foundation for Victor du Pont's firm, V. du Pont de Nemours and Company, consisted almost wholly of real estate of little value — the house in which he lived at Bergen Point, with twenty acres of land; the shop in Alexandria, Virginia, that was bought for his naturalization; and the six thousand acres in Kentucky that had belonged to James Bidermann. Before the Du Ponts came to America Mr. Bidermann's land was managed by an agent who, through carelessness, allowed it to be sold for taxes for twelve hundred dollars. One of Du Pont de Nemours's first efforts in this country was to regain possession of the land, and it was bought in Victor du Pont's name for two thousand dollars.

In spite of the slenderness of his resources, Victor du Pont for the first year did very well. He had a large business with the French West

[1] E. I. du Pont to Du Pont de Nemours, February 7, 1803.

Indies and sent valuable cargoes to France. Unfortunately two of his best ships were lost, many accounts due him were never paid, and in March of 1803 he wrote to Irénée: "I do my best to make money, but if I had to send you now the six thousand dollars I still owe you for the manufacture I would have nothing left. I will send it little by little, the later the better, and better still if you could get it somewhere else; but even if I sent it at once it would be insufficient to finish the work." [1] To make matters worse, Victor, who was still hoping that he might be appointed financial agent for the French Government, advanced to Pichon the French Consul-General, two hundred thousand francs, "chiefly in notes that have long to run," [2] in return for San Domingo drafts on the Paymaster of the French Navy, which Victor sent to Paris for his father to collect, an operation that was necessarily slow even when successful. From that time he was entirely occupied by his efforts to meet those notes; there was nothing left for Irénée's powder mills. But the building went on in spite of all discouragement; Irénée at last asked his brother to buy and send

[1] Victor du Pont to E. I. du Pont, April 23, 1803.
[2] *Ibid.*

him six tons of saltpetre, and in July, 1803, he wrote to President Jefferson "to ask his interest, and work for the mills. The result was a letter from the Secretary of War giving us the refining of saltpetre now in the Government's possession; the making-over of damaged powder; and the furnishing of new powder when the Government shall need it."[1]

At last in the spring of 1804 there was powder ready for sale, and Victor, to whom some of it was sent, wrote, "You may be sure that I will do my best to sell the powder and I will certainly succeed,"[2] and he suggested a notice in the papers:

E. I. DU PONT DE NEMOURS GUN POWDER MANUFACTORY

Wilmington, Delaware

This new and extensive establishment is now in activity and any quantity of powder, equal if not superior to any manufactured in Europe will be delivered at the shortest notice.

Samples to be seen at

V. DU PONT DE NEMOURS ET C^IE^
New York[2]

[1] E. I. du Pont to Du Pont de Nemours, August 8, 1803.
[2] Victor du Pont to E. I. du Pont, May 1 and 2, 1804.

[FACSIMILE]

free
Th: Jefferson Pr. US.

Wm. E. I. Dupont de Nemours

Eleutherian mills

near Wilmington Del.

Dear Sir

Washington Nov 23 04

It is with real pleasure I inform you that it is concluded to be for the public interest to apply to your establishment for whatever can be had from that for the use either of the naval or military department. the present is for your private information; you will know it officially by applications from those departments whenever their wants may call for them. Accept my friendly salutations & assurances of esteem & respect

Th: Jefferson

All seemed to be going well at last. But the powder was sold on long credit, and the workmen had to be paid and the materials bought. Jérôme Bonaparte, who was then in New York, promised Victor du Pont to help him with his influence with Napoleon, and on the strength of those promises was spending all the ready money that Victor could give him. It was necessary to ask Bauduy for the use of his credit, and he became "nervous and worried about the result."[1] He wrote to Victor to complain of Irénée's methods, of the expense of the farm, of the cost of feeding the workmen. Victor advised his brother to conciliate Bauduy, but Irénée was exhausted by hard work and desperately afraid that his whole venture would fail for lack of funds. He was getting long letters from his father complaining, rather unfairly, of Victor's investments, and criticism of his brother always hurt him deeply, especially now when he knew that Victor was on the verge of failure. He was in no conciliatory mood; and Bauduy chose that unfortunate moment to assert authority in the business, and when that authority was questioned he threatened newspaper publicity and a law-suit.

[1] Victor du Pont to E. I. du Pont, July 10, 1804.

The two men had never been congenial — Bauduy seems to have been full of hospitality and good cheer, while Irénée admitted his own "coldness and sensitiveness."[1] Bauduy, however, was not frank in his business methods, while Irénée was sincerity itself, and was horrified to find that he had been led to sign papers written in English,[2] which at the time he understood imperfectly, giving Bauduy a full partnership in the powder company. On Bauduy's side, instead of the four thousand dollars that he at first offered, he had put into the business eight thousand dollars in actual money and notes for eighteen thousand dollars more; naturally he wanted to know how its affairs were administered. Both men wrote all their anger to Victor du Pont, who tried with some success to explain away their grievances.

The greatest difficulty for the moment was the name of the new firm. Partly because of his knowledge of English and partly because Irénée du Pont was engrossed in the construction work, Bauduy had done all the correspondence of the company and had done it in his own name. Du Pont objected to that arrangement,

[1] E. I. du Pont to Victor du Pont, December 13, 1804.
[2] E. I. du Pont to Peter Bauduy, December 14, 1804.

which gave outsiders the right to suppose that he was merely the head-workman in the mills. Bauduy then suggested, what he had probably had in mind all along, that the letters be signed "Du Pont, Bauduy and Company," but Du Pont's answer was very emphatic — "If, as I hope, it earns a reputation greater than that of others, and if it makes a name — that name should be mine."[1]

He carried his point; and though he died more than eighty years ago the signature is still "E. I. du Pont de Nemours and Company." The name is his.

[1] E. I. du Pont to Peter Bauduy, December 12, 1804.

CHAPTER III

1805–1809

IN June of 1805 the output of the mills warranted the employment of outside agents, and Irénée du Pont's letters to his father show more confidence for the future. He had "made twenty-two thousand pounds of powder for the frigates sent to Algeria. This powder was tested several times at Federal City[1] and was compared with powder sent by all of the manufacturers, as well as with some lately secured from England, and it proved so superior that old Mr. Dearborn,[2] in spite of his unwillingness, sent us about one hundred and twenty thousand pounds to remake and a part of his saltpetre to refine, and he announced publicly on the Fourth of July before the officers, who were delighted with our powder, that in future we will do all the Government work. Beside that, I have in the last month made forty thousand pounds for the Spanish Minister." [3]

He had become self-supporting just in time,

[1] Washington. [2] The Secretary of War.
[3] E. I. du Pont to Du Pont de Nemours, August 6, 1805.

for in August of 1805 Victor du Pont failed, partly because he never had sufficient capital, but chiefly because the French Government refused to honor certain San Domingo drafts on the Paymaster of the French Navy. In the first six months after Du Pont de Nemours's return to France, Victor du Pont received in payment of various cargoes to Guadeloupe and San Domingo four hundred and seventy thousand francs in drafts that were cashed in Paris by his father. Later on he paid the expenses in New York of a squadron of five French frigates from Guadeloupe and was fully reimbursed by the French Government for that and for furnishing various supplies for other vessels. He was still eager to act as American financial agent for the French Government, and both Jérôme Bonaparte and the Consul-General, Pichon, encouraged his hopes and borrowed of him freely. By 1805 he held San Domingo drafts to the amount of five hundred thousand francs, which he forwarded to his father for collection. Very many other San Domingo drafts were presented for payment at the same time. Few of them were accepted by the Government and those few were paid only a small percentage of their face value. The ones held

by Victor du Pont, however, were specially discriminated against by the Emperor Napoleon's decree censuring Pichon's accounts and refusing to pay them; the fact that Pichon was dismissed from his office in no way helped Victor du Pont.

Of course Irénée could expect no more help from Victor; indeed he was in some danger from creditors of the New York firm, many of whom applied to him for their payments; but Victor had been very careful to protect his brother's interests. The failure, however, more than doubled Irénée's burden, for his father's company in Paris had been existing almost entirely on the sale of the cargoes sent over by Victor, and Irénée had now not only the anxiety of his own business — he had also to contribute to the support of both his father and brother until the latter could get on his feet again; at home he had always to bear with Bauduy's fault-finding, and he could not bear it cheerfully. He was most anxious that his father should return to this country and live with him, for he was quite sure that the Paris firm was losing money, and he believed that his father's friendships in America would be helpful for the powder interests. But Du Pont de Nemours

was happily occupied in Paris; he had been made President of the Chamber of Commerce; he was among his old friends of the Institut, of the Société Philanthropique, of the Société d'Encouragement pour l'Industrie; above all, he was editing the works of Turgot, and he could not be persuaded to leave Paris while his task was unfinished.

Meanwhile the business was gaining slowly: in 1804 the sales amounted to ten thousand dollars; in 1805 to thirty-three thousand; in 1806 they dropped to thirty-two thousand; in 1807 they were forty-three thousand. "But," Irénée wrote to his father, "in spite of this success I am still somewhat embarrassed, and as yet have been unable to pay any part of the eleven thousand dollars that I borrowed from the bank, because the first expenses and the completion of the establishment cost more than I had calculated, and because in that calculation I forgot the credit of six months and more that we must necessarily allow on all sales; thus there is from twenty-five to thirty thousand dollars due us now."

In the same letter, dated February 8, 1808, he tells of the first explosion in the mills: "Tired of building and forced by the demand

to start manufacturing as soon as possible, I was obliged to use a house that was already built, sixty feet from the graining mill, to make a heated dry-house. Attached to this was another building that was formerly used in the cotton manufactory [1] and that I use for a charcoal house, having no other. I knew that the charcoal had several times lighted spontaneously at the Essonne mills and at other mills in France; I knew the danger of thus having powder and charcoal under the same roof; but my partner [2] did not think as I did; we were tired of building and we had to start. On the 18th of August [3] we had taken the charcoal out of the furnace with the fire absolutely extinguished. When we stopped work in the evening Dalmas [4] and I went to look at the charcoal to be sure that there was no appearance of danger; we saw none. After supper Dalmas said, 'We should go back and look at the charcoal — it is too dangerous. Will you go or shall I?' Then he added, 'You are tired; I will go.' In less than fifteen minutes after he left the drying-house exploded with a tremendous crash. I ran down, convinced that Dalmas was lost.

[1] Built by Jacob Broom in 1795. See also Appendix, p. 189.
[2] *Associé*, i.e. Bauduy. [3] 1807. [4] His brother-in-law.

NO. 1. ELEUTHERIAN MILLS, 1806
From a drawing by Charles Dalmas

Imagine my joy when he was the first to answer my call. We spent the rest of the night putting out the fire and preventing it from spreading to other buildings. All of the window panes in my house were broken and some of the windows blown in. What proved most fortunate for us and really seemed help sent from Heaven, was the light wind, cold and damp, that was blowing from the northeast and had thoroughly wet all the roofs." Most fortunate was that damp wind, for a serious explosion just then would have been disastrous.

The original agreement with the shareholders[1] had specified that an accounting should be given them at the end of 1809. That statement, which was much belated, showed that the sales for the six years amounted to $243,554.79 and the profits to $43,613.31. Irénée du Pont and Bauduy, who together held only five of the eighteen shares of stock, promptly invested the whole profit in very necessary raw materials and in payments on some of their notes; at which the European shareholders, who had

[1] There were eighteen shares in the powder company. E. I. du Pont owned one; Bidermann, one; Bauduy, four; the remaining twelve were held by Du Pont de Nemours Père et Fils et Compagnie. See Appendix, p. 175.

counted on enormous dividends, were loud in their expressions of indignation.

STATEMENT OF GUNPOWDER SOLD BY MESSRS. E. I. DU PONT DE NEMOURS & CO. AND THEIR AGENTS UP TO THE 31 DEC., 1809

Sold by themselves	*Quantity in pounds*	*Kegs*	
1804	11,350	454	$ 4,368.00
1805	80,720	3228	29,581.00
1806	38,269	1527	14,239.00
1807	38,551	1541	13,495.00
1808	53,900	2156	22,523.00
1809	25,456	1018	12,694.00
			$96,900.00
Sold by the following agents			
Mitchell & Shepherd		330	2,927.65
Delaire & Canut		249	2,552.07
V. du Pont de Nemours & Co		96	787.52
Aubin Laforest		550	5,829.36
John Sullivan			253.27
Anthony Chs. Cazenove		975	10,213.10
Anthony Girard			33,972.55
Richard Bowden & Co		302	2,545.98
Archibald McCall			36,486.16
Brujiere & Teisseire		490	5,505.85
Suydam & Wickoff			674.96
D. P. Dows & Co			465.79
Thomas Shewall			4,548.39
Benjamin Herr		32	
John Hancock		470	4,987.32
Samuel Hastings			410.00
John Strong			472.10
Watkinson & Co			716.78

John Chew		426.50
John Thurston		300.
Anthony Buck		184.04
Mein & Rodgers	66	570.24
John Whipple		854.75
Richard Drummond & Co	140	1,630.51
		$214,214.79

$5,355.37 P. Bauduy's Commission @ 2½ pr. ct.

	Brought forward	$214,214.79
Gunpowder manufactured & remanufactured with the saltpetre of the U. States.		
	Lbs.	
In 1805	35,000	2,800.00
1806	67,200	5,376.00
1807	29,500	2,360.00
1808	98,400	8,116.00
1809	93,800	10,688.00
	$29,340.00	$243,554.79

$1,467.00	P. Bauduy's Commission @ 5 pr. ct.
5,355.37	Brought forward.
$6,822.37	Carried to account currant

Inventory of the money, prime materials, gunpowder manufactured, goods, land property, improvements on the same; and debts belonging to E. I. du Pont de Nemours & Company: as also of the debts due by Them to Others on the 31st day of December, 1809, when the term of their original association expired, as per Statements in waste book No. 6, folios 1 and 24; and in Journal No. 7, folios 1 and 26:

To Wit

Belonging to them

Cash in the Delaware Bank	$ 1,911.66
Prime materials outstanding: valued at	4,028.34
Gunpowder unsold: valued at	21,780.64
Bills receivable	1,130.00
Goods and land property mortgaged to them	5,712.97
Real estate of their own, buildings thereon, machinery and utensils: valued at	42,750.00
Book debts due to them	31,504.31
	$108,817.92

	Brought over	$108,817.92
They are indebted as follows:		
Book debts due by them	$22,304.24	
Promissory notes due by them	6,900.00	
18 shares due to the stockholders	36,000.00	65,204.24
Profit made since the 21 April, 1801, to the 21 Dec., 1809, and divided as stated in waste book no. 6, folio 24		$43,613.68

Shares of Stock		*Shares of Profit*			
1	J. Bidermann	1	placed to a/c	ct.	1,453.78
12	Du Pont Father & Co.	12	"	"	"	17,445.47
4	Peter Bauduy	7	"	"	"	10,176.52
1	E. I. du Pont	10	"	"	"	14,537.91
					$43,613.68

CHAPTER IV

1809–1814

DU PONT DE NEMOURS and his son had expected much help for the powder company from the Government because of their friendship with Thomas Jefferson — help that the President was very willing to give so far as he was able; but the heads of the Army and Navy ordered their own supplies, and at the end of 1809 the total sales of powder to the Government had only amounted to about thirty thousand dollars.[1] That estimate did not include the powder sent to "Indian agents," who ordered according to their individual fancies and in their own names, but even so the encouragement given by the Government amounted to very little.

In January of 1809 Irénée du Pont wrote to his father: "The Secretaries only employ me when they cannot do otherwise, regardless of their Chief's wishes. Things are done here much as they are in France. They have given the re-

[1] Statements of gunpowder sold by E. I. du Pont de Nemours and Co., December 31, 1809, and December, 1815.

fining of saltpetre to an apothecary[1] who does not understand it at all and who spoiled ninety thousand pounds that the Government gave him to do. As an excuse for giving him the work, they said that he charged half a cent per pound less than I, and then paid him exactly what I had asked, and they allowed him a loss of eighteen per cent on saltpetre that he delivered damp, while the fifty thousand pounds that I refined and delivered perfectly dry was only allowed fourteen per cent. Therefore, beside the loss of the refining, which will have to be done over if they ever want to make good powder of his saltpetre, the Government lost more than fifty thousand pounds of saltpetre, which the apothecary put in his pocket."[2]

As a matter of fact, though the French shareholders were far from pleased with the returns on their American investment, the growing importance of the mills interested many speculative "apothecaries" and manufacturers, who knew that the plant consisted of a few small stone and wooden buildings and some very simple unpatented machinery. They believed that they, too, could turn some chemical

[1] Dr. Hunter, of Philadelphia.

[2] E. I. du Pont to Du Pont de Nemours, January 28, 1809.

knowledge to practical purpose. They quite failed to realize that Irénée du Pont's unusual experience as both chemist and machinist was the essential factor that gave his powder "a reputation greater than that of others."

As a consequence mills of varying degrees of importance were built in different parts of the country. The first powder made at the Du Pont mills was sold in kegs marked "Brandywine Powder Mills," the name suggested by his father. "In a few years, about 1808, a small set of works were put up in Connecticut and the place was named by the owners *Brandywine.* Of course the Connecticut powders were branded exactly as ours and we could have no recourse at law. Our mark was immediately changed to *Du Pont;* it has remained the same ever since and we feel pride in keeping it the same." [1] Powder that was below the "Du Pont" standard was marked "A. F. & Co." Andrew Fountain was the proprietor of a little country store near the mills, and probably sold some of the cheaper powder.

One of the new establishments seems to have had more patronage from Washington than

[1] Correspondence of E. I. du Pont de Nemours & Co., December 13, 1844.

Du Pont had been given. In 1811 Thomas Ewell, who was said to have much influence with the Secretary of the Navy, built mills at Bladensburg, near Washington, and tried to alienate workmen from the Du Pont mills. Finding that impracticable, he offered Mr. du Pont "a connection" with his establishment, admitting that he did not know the mechanical processes for making powder although he had secured large contracts from "the heads of the military departments." [1] Such men as Thomas Law [2] and William Thornton [3] were thoroughly indignant at Ewell's pretensions and urged Du Pont to build mills nearer to Washington, offering to invest their own money and to find more for such a plant. Thomas Law wrote to Bauduy: "Ewell has received four thousand more dollars from the Navy Department. You remember the old motto — In for a penny, in for a pound." [4] And a few months later: "I think you are too backward; I request

[1] Thomas Ewell to E. I. du Pont, December 8, 1811.

[2] Thomas Law came to America from England in 1794, and invested largely in real estate in the City of Washington. He married the granddaughter of Mrs. Washington.

[3] William Thornton was one of the architects of the Capitol at Washington; one of the Commissioners of the District of Columbia; and the first Curator of the Patent Office.

[4] Thomas Law to Peter Bauduy, July 16, 1812.

[FACSIMILE]

Dear Sir Monticello Apr. 24. 11.

We are, four of us, sportsmen, in my family, amusing ourselves much with our guns. but the powder sold here is wretched, carrying the index of the French epreuvette (such as yours, furnished Gen[l] Dearborne) to 9. 10. or 11. only. while the canisters of your powder, recieved from you 2. or 3. years ago, carried it to considerably upwards of 20. I have persuaded a merchant in this neighborhood to get his supply from you which he has promised to do, and I am in hopes the difference which will be found between that & what has been usually bought will induce our other merchants to do the same. I promised mr Lietch, the merchant alluded to, a letter to you when he should go on. this will serve instead of it. but he does not go on till autumn. in the mean time I am engaged in works which require a good deal of rock to be removed with gunpowder, in doing which with the miserable stuff we have here, we make little way. will you be so good as to send me a quarter of a hundred of yours, addressed to Mess[rs] Gibson & Jefferson of Richmond, who will forward it to me. the cost shall be remitted you as soon as made known. vessels pass from Philadelphia to Richmond almost daily, & the sooner I receive it, the sooner I shall make effectual progress in my works. Accept the assurances of my great esteem & respect

Th: Jefferson

M[r] E. Dupont de Nemours.

you to determine pro or con." [1] Mr. Ewell's experiment in powder-making did not last long, for though the War of 1812 was at hand he was unable to profit by the opportunity and he was not heard of after it. In 1817 his mills at Bladensburg were for sale and Irénée du Pont was offered them, but refused to buy them.

As early as 1809 relations between the United States and England were so strained that in Mr. du Pont's letters to his father he wrote of the probability of war and the need of a sufficient provision of saltpetre. War was not declared, however, until June, 1812. A month later the Du Pont agent in Philadelphia wanted a hundred and sixty kegs, "or more," sent to him for the outfitting of privateers in that port.

The Government had ordered fifty thousand pounds of powder in the autumn of 1811. In 1812 two hundred thousand pounds were ordered and in 1813 five hundred thousand. These orders probably did not include all the powder made by the Du Pont Company for the Navy. The principal ports seem each to have had a "Navy agent" who ordered for the Government vessels as they arrived whatever

[1] Thomas Law to E. I. du Pont, December 25, 1812.

supplies they might need. The powder thus furnished was of any make the commander of the ship preferred, and was bought from any local powder agent, whose business it was to secure the order for his own firm.

The fighting was at first near Canada or at sea and did not reach Delaware until March, when Mr. du Pont received the following letter that to-day sounds more like preparation for the Fourth of July than a serious effort to defend the coast:

Wilmington, March 19, 1813

DEAR SIR: I this morning received a letter from Governor Hazlet stating that considerable depredations in Burning of Vessels &c are committed by the British Vessels of War about Lewes Town in Sussex and requests of me to forward him six kegs of your best rifle powder or such as is used for musketry, perhaps one or two of the kegs had best be of Cannon powder. I wish you to have it sent in to Paul McGin's this evening or early in the morning, as we wish to forward it to-morrow with some lead I am procuring.

Yours sincerely

JOHN WARNER

P.S. Send me a bill of the powder.

General Stockton apparently had more faith in artillery than had Mr. Warner, and three weeks later supplemented his order:

Thursday, April 8, 1813

DEAR SIR: By express from Governor Hazlet this morning at one o'clock the enemy's Ship Belvedier had commenced cannonading Lewis Town. In addition to the number casks of powder I am directed to get ten more of Cannon powder, please to send them this day to Mr. Dixson's store.

JNO. STOCKTON

When the British attacked Washington, in August of 1814, about two hundred kegs of Du Pont powder were in a magazine near Alexandria. As the English squadron was insistent in its demands for munitions, the Du Pont agent in Alexandria asked the Government's protection for the magazine. The Government immediately bought all the powder but ten kegs, paying three thousand dollars in cash, and ordered more. In August of that year E. I. du Pont sent to the Government arsenal eighteen hundred and forty barrels of powder, and in November one hundred and sixty-six thousand pounds — amounting to seventy thousand

dollars; all but eighteen hundred dollars of which was paid by January, 1815. From November, 1814, to February, 1815, when peace was declared, he had delivered six hundred and eighty-seven barrels more, making a further $13,740, of which $7601.40 was still due in March, 1815.

The success of the business was now unquestioned. For the first six years the profits had been slightly over forty-three thousand dollars. In 1811 E. I. du Pont wrote to his father, "The profits of 1810 came to more than thirty thousand dollars, and for this year will be between forty thousand dollars and fifty thousand dollars."[1] He felt quite warranted in that year in helping his brother Victor to build, near the powder mills, a factory for the manufacture of woollen cloths. Mr. Bauduy also invested in the new enterprise, as offering an opportunity for his son, and the cloth firm was established under the name that Mr. Bauduy had proposed for the powder company — Du Pont, Bauduy and Company.

After the war Irénée du Pont could probably have paid all his debts and enjoyed the fruit of his labor, but in 1811 the Paris firm of Du Pont

[1] E. I. du Pont to Du Pont de Nemours, May 26, 1811.

de Nemours failed, with twelve shares in the powder company as its only asset.

The capital of the powder company consisted of eighteen shares of two thousand dollars each: twelve shares were held by Du Pont de Nemours Père, Fils et C^ie^,[1] though instead of twenty-four thousand dollars, Irénée du Pont only received $16,470.90 from his father;[2] four shares belonged to Bauduy; one to Bidermann; one to Duquesnoy.[3] But thirty-six thousand dollars, even if it had been paid, proved to be much too low an estimate for building and operating the mills, and Irénée du Pont and Bauduy borrowed thirty thousand dollars more from Philadelphia and Wilmington banks with which to complete the plant. In Paris, Du Pont de Nemours was constantly describing Irénée's great success, and repeatedly told his shareholders that the powder company would repay all they had lost in his company and Victor's. In a letter to Mr. Bidermann,

[1] The original *commandite*, or limited stock-company, the office of which had been removed to Paris.

[2] E. I. du Pont to Mme. Bureaux de Pusy, January 16, 1813. This letter explains many of the early difficulties of the powder company.

[3] The share originally belonging to Duquesnoy was bought by Du Pont de Nemours for E. I. du Pont in 1808, from Catoire & C^ie^.

written on April 18, 1808, he said: "I think that after the manufactory has had some improvement and has repaid the one hundred thousand francs that I borrowed for it,[1] each share will pay six hundred dollars a year, and therefore will have a real value of six thousand dollars. For one cannot estimate the capital of a manufacture and one so hazardous as gunpowder at more than ten times its profit. But even that would be three times the original cost of each share of my company. And it follows that the twelve shares that my company owns in the powder company would equal thirty-six shares in the company that bears my name — of which I am the head."

By the original agreement[2] the shareholders had the right to dissolve the powder company and divide its assets at the end of 1809 — and at stated periods thereafter — if two thirds of them notified Irénée du Pont of their wish to do so six months before the specified date.

[1] This sum, equivalent to twenty thousand dollars, was borrowed from Prince Talleyrand. Irénée du Pont had not asked his father for money, and he only received twelve thousand dollars of it; eight thousand dollars was spent in Paris. Yet the powder company was charged with the whole amount. (E. I. du Pont to Mme. de Pusy, January 16, 1813.)

[2] See Appendix, p. 178.

Irénée had, however, the first right to buy their shares, at the value given in his previous yearly report. Neither Du Pont nor Bauduy was a trained accountant, and misunderstandings with the shareholders were frequent. But the limit of tension seemed to be reached when at the time of his father's failure each one of the thirty-six shares of his father's company — the *commandite* — was translated into one third of a share in the powder company,[1] and they all demanded full and immediate payment of their shares. Irénée du Pont wrote letter after letter begging them to wait until he had enough capital to keep supplied with raw material. Even his father could not realize Irénée's situation and the necessity of meeting the notes that he and Bauduy had given to build their own and Victor du Pont's mills. During the War of 1812 letters to France often took six months to reach their destination; and conditions would entirely change while Du Pont de Nemours was waiting for answers to his questions. It became most important for the brothers that their father should come to America to be convinced of what they had so often written him — that Bidermann, Mme.

[1] See Appendix, p. 181.

de Staël (who had inherited from her father, Necker, two shares in the Paris firm of Du Pont de Nemours), and the other *associés* were doing their utmost "to kill the goose that lays the golden eggs for us all." [1]

But for the time being persuasion was useless. Du Pont de Nemours could not bring himself to leave France while his literary work was unfinished; and in April, 1814, Napoleon abdicated, the Bourbons returned to France, and Du Pont was appointed Secretary of the Provisional Government — then Chevalier of the Legion of Honor and Counsellor of State.

[1] E. I. du Pont to Du Pont de Nemours, July 4, 1811

CHAPTER V

1814–1816

FOR several years Du Pont and Bauduy had continued their business relations chiefly because they were devoted fathers, and their children, Victorine du Pont and Ferdinand Bauduy, had become engaged to be married. So little did Irénée du Pont like this arrangement that in 1810 he encouraged young Bauduy's desire to finish his education in Europe, hoping that his absence would end the understanding; but Bauduy returned in June of 1813 and married Miss du Pont the next November. Only a few weeks later, on the 21st of January, young Bauduy died of pneumonia in Mr. du Pont's house. His daughter's passionate grief, as well as that of Mr. Bauduy, who was for the moment overwhelmingly grateful for the care given his son, touched Mr. du Pont very deeply, but the only link that might have held him and Mr. Bauduy together was broken, and misunderstandings and fault-findings went from bad to worse.

In 1813 Mr. du Pont bought from Thomas Lea, for forty-seven thousand dollars, the es-

tate known as Hagley, in order to add new powder mills which the growth of the business required. In the summer of 1814 Bauduy was complaining of the cost of the new plant, and in December of that year Du Pont offered to buy Bauduy's shares in both the powder and wool factories. A notification of the change in the firm was sent to various banks and agencies in January and February, 1815:

To Daniel Byrns,

Cashier of the Bank of Wil^n & Brandy^e

Our present object is to inform that the partnership which existed between Mr. Peter Bauduy and ourselves is dissolved, in consequence of our having purchased his shares in the concern.

the manufacturing of gun Powder will continue to be conducted as formerly, under the same firm, by E. I. du Pont, whose only signature please to acknowledge for the future.

Mr. du Pont and Mr. Bauduy held very different opinions of the values of the shares of the two plants, and legal arbitration became imperative. While the claims of both men were being considered, Du Pont learned to his amazement that in the previous June Bauduy

had written confidentially to the French shareholders making all kinds of accusations against Du Pont's integrity as well as his administration of the business. That was, of course, the end of all friendly relations between the two men; but it served one excellent purpose in accomplishing what both Du Pont brothers had urged for ten years — the return of their father to America. Because of his position in the Government of Louis XVIII he did not come immediately, though he was anxious to see for himself what truth there could be in Bauduy's charges. In the following March, however, Napoleon returned to Paris, the Bourbon Government again collapsed, and in May, 1815, Du Pont de Nemours was in Delaware, where he spent the two years that were left of his life. His presence was a great help to his sons. His unconquerable good spirits, his warm sympathy, and his fluent pen were now on this side of the ocean; and he was as ready to explain to the French shareholders the difficulty of sending money from a country that was doing all its business on credit as he had been in insisting to his sons that his creditors must be paid immediately from the American earnings.

Another result of Mr. Bauduy's letter was that James Bidermann of Paris, who was one of the chief shareholders, sent his son, Antoine Bidermann, to America as his representative. When Mr. Bauduy retired from the partnership in February, 1815, his duties, which consisted mainly in travelling about the country to see the various agents, were assumed by Mr. Bidermann.

In 1816 an Alexandria newspaper published an advertisement, which with slight modifications was printed in all the large cities:

NOTICE. — PETER BAUDUY'S BEST GUNPOWDER

Having for thirteen years been concerned in the manufactory of Gunpowder of E. I. Dupont (de Nemours) and Co. and having last year withdrawn from the said concern, I have established a manufactory of the same article under my particular care, and beg leave to inform the public that a constant assortment of gunpowder will be found with my agent Mr. John Roberts, merchant, of Alexandria, which will be warranted to be of the first quality, and will be sold on the most reasonable terms.

PETER BAUDUY

Brandywine, August 25

Mr. Bauduy had received from the powder company $108,690.31 since 1804, including the purchase from him of his four shares for eight thousand dollars;[1] but he was not satisfied with the terms offered by Mr. du Pont and brought suit against him in March, 1816. Bauduy rejected all efforts for arbitration, and it was not until April, 1824, after many postponements, decisions, and appeals, that the case was finally decided in Mr. du Pont's favor.

Bauduy's accounts were very complicated, partly because "in return for arranging and sustaining his credit he demanded, beside the interest due on his four shares, that he should be given a profit equal to the interest on three other shares which had been held in reserve by the Company to be given to certain persons who had an influence with President Adams and his Secretary that was supposed to be essential, but that it was not necessary to consider during the administration of the upright Jefferson." [2]

In the meantime Eden Park, Bauduy's estate near Wilmington, was rapidly being turned

[1] Statement of Profits and Interest received by P. Bauduy from E. I. du Pont de Nemours and Company, January, 1819.

[2] Statement by Du Pont de Nemours, Père, to the shareholders in his company, April 18, 1808.

into a powder yard. The mills were small and driven by horse-power; and were as nearly as possible copies of the Du Pont mills. The kegs were marked "Brandywine Powder." "But," wrote Du Pont de Nemours, "even though he has taken many of our workmen, though he uses almost the same machinery and methods of mixing — no powder compares with ours — all because of Irénée's skill and his marvellous industry." [1]

[1] Du Pont de Nemours to Johannot, undated, but written about May, 1817.

CHAPTER VI

1817–1837

IN August of 1817 Du Pont de Nemours died at his son's house in Delaware. Irénée du Pont was intensely fond of his father and felt his death keenly; and with the personal grief came increased anxieties. His relations with the shareholders of his father's company could no longer be adjusted by the explanations and postponements that were so easy to Du Pont de Nemours, whose cheerfully philosophic mind always had an amazing ability for proving that in a short time his shareholders would be marvellously enriched by their American investments. He persuaded the richer investors in his company to allow their dividends to accumulate, and gave varying sums of money as dividends to those who were more insistent. At his death, however, promises were inadequate; all the shareholders except Bidermann demanded payment of their original capital with interest. In addition to that indebtedness, Du Pont de Nemours, in November, 1807, had borrowed one hundred thousand francs

from Prince Talleyrand, in order to relieve Irénée of the need of constantly asking Bauduy to renew his notes. Some of the money was spent by Du Pont de Nemours in Paris, much of it for buying up shares in his own and the powder companies, but twelve thousand dollars of it had been used in the powder company and Irénée du Pont accepted the responsibility of the whole amount, as well as of seven thousand francs borrowed from Mme. de Staël, in 1814, with which he had nothing to do. The money paid to Bauduy for his share in both the powder and the wool mills had already taxed the company's resources to an alarming degree; and the climax was reached when in March, 1818, five powder mills exploded, destroying almost the entire plant and over eighty-five thousand pounds of powder. The actual loss was about thirty thousand dollars.[1] The catastrophe brought a temporary relief, for the French creditors saw the uselessness of demanding immediate payments and were induced to accept long-term notes for their shares in the business.

Shortly after the War of 1812 the Government had found itself in possession of a large

[1] E. I. du Pont to LeRoy, Bayard & Co., February 12, 1819.

quantity of hurriedly made or damaged powder, and offered it "on loan" to various powder companies. E. I. du Pont took more than three hundred and fifty thousand pounds of this powder, which fortunately was not lost in the explosion and served to supply the agents until the mills were rebuilt.

Business conditions in America were very peculiar in those days. There was infinite opportunity for manufacturing and very little money for investment. Credit had to be stretched to the utmost. To quote a letter written by Du Pont de Nemours to a French banker: "Houses without number have been built of paper; water-power for factories and the factories themselves — of paper; canals and roads — of paper; beautiful and useful steam-boats — of paper."[1] Good notes were discounted at one and a half per cent a month; and important firms were constantly failing, among them several Du Pont agencies. Mr. du Pont estimated his losses from 1817 to 1819, from bankruptcies, explosions, etc., at one hundred and forty thousand dollars, and from deterioration of values of real estate because of the general financial distress, at fifty thousand

[1] Du Pont de Nemours to Johannot, May, 1817.

dollars more; yet the powder company steadily gained in strength. The reputation of the powder became well established and Mr. du Pont was liked and respected. He was appointed a director of the Bank of the United States; was consulted by those in authority concerning legislation for helping manufacturers and farmers; and his notes were accepted from Boston to New Orleans. He made a large part of the Government powder; he sold about twenty-five thousand pounds a year to the American Fur Company, of which William Astor was president; he supplied many of the West Indian and South American States; but all on credits of four, six, and eight months. In 1824 he wrote from Philadelphia to his wife: "It is cruel to ride sixty miles every five or six days to meet one's notes, and so to waste one's time and one's life. God grant that some day I may get to the end of it." He never did. It was not long after his death that the last of the French notes were paid and that the company became wholly American; but in the last year of his life he gave a very real proof of his loyalty to the country of his adoption.

In 1833 the Nullification Party in South Carolina deeply resented certain import duties

ordered by Congress. The State threatened to secede from the Union; and, through the New York agent, offered the Du Pont Company twenty-four thousand dollars in cash for one hundred and twenty-five thousand pounds of cannon and musket powder. Mr. du Pont answered: "The destination of this powder being obvious, we think it right to decline furnishing any part of the above order. When our friends in the South will want sporting powder for peaceful purposes we will be happy to serve them." [1] Two months later he himself wrote: "Our E. I. du Pont has been in Washington assisting at the treaty of peace between your friends, the Nullifiers, and ours, the monopolist manufacturers of the North. Now that the affair has ended so amiably I almost regret that we refused to supply the powder. We would be very glad to have that twenty-four thousand dollars in our cash box rather than in that of your army." [2] Perhaps the affair would not have ended so amiably had the powder been forthcoming.

On the 31st of October, 1834, E. I. du Pont died in Philadelphia after an illness of only a

[1] E. I. du Pont to Wm. Kemble, January 12, 1833.

[2] E. I. du Pont to Pitray, Viel & Co., of Charleston, March 2, 1833.

few hours. His business was successful; its future was to be greater than he could have imagined; but the three people for whose sake he had struggled and saved, the three he most dearly loved — his father, brother, and wife — had died while the struggle was still at its worst. Good citizen though he was, there were times when his heart ached for France, for the friends that he had loved, and whom he never replaced. Of his seven children only three were born in France and the eldest was but seven years old when they left there. His deep affection for Antoine Bidermann, who married his second daughter, Evelina du Pont, was partly because Bidermann, too, was a Frenchman and understood the homesickness that at times could not be conquered. His children were devoted to him and he to them; his neighbors and employees respected and loved him; and his daily work had been free from annoyance and contention since Bauduy left. But after thirty-three years of anxiety and toil, it was hard that he should die just before the last payments on the old debts were made, just too soon to have realized his victory.

For the next three years the business was managed by Mr. du Pont's son-in-law, An-

toine Bidermann, and his eldest son, Alfred du Pont. At the end of that time Mr. Bidermann went to France to arrange for the final payments to the creditors of Du Pont de Nemours; and though he returned to live for many years in America, he never resumed an active part in the firm. He had been Mr. du Pont's friend and confidant for nearly twenty years and was better fitted than any one else to administer the estate; but that duty accomplished, he gave place to E. I. du Pont's three sons, who were well qualified to take up their father's life-work. The notifications of the new partnership were dated April 1, 1837.

It is almost impossible to form any estimate of the firm's profits in the last few years of Mr. du Pont's life. According to his statements in the Bauduy suit, the gross sales of powder, which in 1804 were $10,015.10, had in 1812 (during the war) reached $148,597.62; but in the next year they dropped to $107,291.20, and were still lower in 1814. In 1819 Mr. du Pont wrote that within two years the company had lost in explosions, bankruptcies, etc., over one hundred and forty thousand dollars, and by depreciation in real estate fifty thousand dollars more. In 1832 he wrote: "The amount of

gunpowder manufactured annually by us is at this time about eight hundred and fifty thousand pounds. The quantity made since the establishment of the manufacture to the present time is about thirteen million four hundred thousand pounds." [1]

The company also sold refined saltpetre, charcoal, pyroligneous acid, iron liquor (a red dye), and creosote, or exchanged any of those products for crude saltpetre. To keep supplied with this essential ingredient was from the beginning the greatest difficulty with which Du Pont had to deal. Most of the saltpetre in this country was brought from India. The Du Pont mills were at first supplied by New York and Philadelphia commission merchants at a cost of about fifteen cents a pound, but at the end of 1807 the United States declared an embargo against England and the importations could not be depended on. Du Pont was told that saltpetre had been found in caves in the western part of Virginia and in Kentucky, and he determined to go himself to look for it. There seemed to be many possibilities, if one may judge from the itinerary sent him from Alex-

[1] Answers to queries received from the Secretary of the Treasury. E. I. du Pont, April 12, 1832.

andria: "I would recommend to Mr. du Pont to commence his researches for saltpetre at Franklin in Pendleton County, and pursue his route along the foot of the Alleghany Mountain, keeping the mountain on his right; from Franklin to the warm springs in Bath County, from thence to Fincastle in Botetourt County, thence across the Alleghany mountain to Uniontown, also in Monroe County. My Knowledge of the saltpetre country does not extend further than the above direction, but in this route he can make himself acquainted with the whole saltpetre country." [1] It was a delightful trip that was suggested to him, through the most beautiful part of Virginia. The Warm Springs had been famous among the Indians for their health-giving properties; and Washington and the Custis family made them fashionable. But it is probable that Mr. du Pont never found time for the journey. At any rate, he did not buy saltpetre there.

During the War of 1812 no saltpetre was imported, and that from the Mammoth Cave in Kentucky sold for thirty-five cents a pound. Fortunately, during Jefferson's administra-

[1] A. C. Cazenove to E. I. du Pont, August 19, 1808; quoting Mr. John Roberts.

tion Mr. du Pont had reminded the President of the difficulty of getting saltpetre from India in times of war, and the Government, acting on Du Pont's advice, bought and stored about fifty thousand dollars worth of it — an ultimate saving to the Government of about five hundred thousand dollars.

After the Treaty of Ghent saltpetre was again brought from Calcutta at about seven cents a pound, but the supply was uncertain in both quantity and quality. As early as 1832 Du Pont was getting all possible information about the saltpetre found "halfway between Valparaiso and Callao," but was told that "its basis is nitrate of soda and it is unfit for the composition of gun-powder." [1] In 1838 a large quantity of "Peruvian saltpetre" was offered in Boston at three and a half cents when Indian saltpetre was at six, but the Company refused to take it.

The problem of transportation was a difficult one. For the first few years everything was shipped by sea and taken inland by wagons; and the loss in storms and from inadequate protection was very great. During the War of 1812

[1] Lieutenant Irvine Shubrick to E. I. du Pont, from Valparaiso, November 18, 1832.

PENNSYLVANIA & OHIO
TRANSPORTATION LINE.

The undersigned proprietors of the above Line, will be prepared on the opening of the Canals (say from 1st to 15th March next) to forward goods to Pittsburg daily, via Schuylkill, Union and Pennsylvania Canals and Portage Rail Road, in as quick time and at as low rates as by any other Line.

Goods directed to our care if ordered into the Schuylkill, can be received and forwarded free of charge of porterage, &c.

Freights and expenses paid on goods consigned to our address, and forwarded without charge of commission.

JAMES STEEL & Co. *Arch street wharf, Schuylkill.*
ROYER & McLANAHAN, *Hollidaysburg.*
McDOWELL & Co. *Pittsburg.*

JAMES STEEL & Co. and **GEORGE MULHOLLAN Jr.** having associated themselves together under the firm of **JAMES STEEL & Co.** intend doing a general Commission business on the Schuylkill; having a commodious Warehouse, will be prepared to receive and make liberal advances on any articles consigned to them for sale.

JAMES STEEL & Co.

Philadelphia February 20th, 1838.

A CIRCULAR RECEIVED BY E. I. DU PONT DE NEMOURS & CO. IN 1838

our coasts were patrolled by English gunboats and transportation by land became imperative. Regular freight lines of wagons drawn by four or five horses ran from Boston to Baltimore and from Philadelphia to Pittsburgh. Canals were cut in every direction, greatly relieving the situation except when there was ice; but for several months of each year powder could be moved only in wagons, and the freight added materially to its price. In 1835 the New York agent wanted to fill an order for supplying the frigate Constitution, then in New York Harbor, and as the Delaware River was closed by ice, he suggested sending it by the new Camden and Amboy Railroad.[1] The Philadelphia agent was instructed to inquire about it, and wrote to Bidermann, then head of the firm, that the freight from Camden to New York would be $1.25 per hundred pounds — as against twelve and a half cents a keg[2] by schooner from Wilmington to New York. He added: "Mr. Stevens, the principal proprietor of the Rail

[1] Grading for the Camden and Amboy Railroad was begun at Bordentown in 1830. An "exhibition trip" was made in 1831; but the road was not completed from Camden to Jersey City till 1839, when the management announced that the entire journey would be made in "between six and seven hours."

[2] A keg probably held twenty-five pounds.

Road line, says that as thirty miles of the Rail Road has no horse track it would be necessary and unavoidable that they should use a Locomotive Engine which should be placed behind the train of cars, so as to *propel* instead of *drawing* them. Precaution, he said, would be taken by covering the cars, which are tight roofed and sided, with cloths dampened so as to prevent accidents from sparks. When the powder arrived at Amboy they would put it on board a sloop and tow her to New York by the steam-boat that carries merchandise and not passengers."[1]

[1] F. G. Smith to E. I. du Pont de Nemours & Co., March, 1835.

CHAPTER VII

1837–1860

WHEN Antoine Bidermann retired from active business in 1837, Alfred du Pont, the eldest son of E. I. du Pont, and his two brothers, Henry and Alexis, formed a partnership, still using the original name of the firm. Alfred had been in the business for nearly twenty years and was fourteen years older than Henry, the brother next to him in age; he naturally assumed the direction of the company, following as closely as was possible the methods that he had learned from his father. Thanks to that father's industry and courage and to the financial skill of Mr. Bidermann, the firm was out of debt, and the younger brothers were quite able to relieve Alfred of the details of the manufacture. He began at once to improve his equipment. The wooden kegs for shipping powder, bought in Boston and Philadelphia, were of all sizes and qualities, and were often altogether lacking when they were most needed. His first innovation was to bring coopers and their machinery to the Brandywine and start the manufacture of kegs on the premises. Pow-

der destined for New York and New England had been loaded from small boats on schooners near Marcus Hook, but the wagons carrying the powder did not leave the mills until the schooner signalled that it was waiting, and if the weather was bad and powder could not be loaded the vessel proceeded and the powder was kept until another opportunity should offer. Agents objected to so uncertain an arrangement, so Alfred du Pont built a pier and magazine three miles above Wilmington, on the Delaware River; the abandoned magazine still stands at Edge Moor.

For the next ten years such improvements constitute the story of the company. Untiring effort was necessary in order to keep pace with the growth of the country — a growth so rapid that no financial system could support it. Failure followed failure. "We have seen within the last four years many sudden and heavy changes in money matters, but the crisis of the last week exceeds anything of the kind it has been our lot to experience." [1] In 1841, "All the states are insolvent, if by insolvent we mean unable to pay their bills." [2] And the following year,

[1] Alfred du Pont to Wm. Kemble, February 7, 1841.
[2] Wm. Kemble to Alfred du Pont, November, 1841.

GREAT WESTERN LINE.

ELDER, GELSTON & CO.

FORWARDING AGENTS.

34 & 36 COMMERCE STREET WHARF, BALTIMORE.

Baltimore, [illegible] 20th 1845

Received of [illegible] the following packages of Merchandise, which we promise to ~~deliver~~ forward to [illegible] named below — in [illegible] within — days, at the rate of $ — per 100lbs. and charges.

Eight ~~Dollars~~

MARKS.

W L & Co	[illegible]	50 Kegs Gun Powder	1600 lbs	
	Charges			
	Extra drayage to Mt Clare Depot		1.50	
			$24.00	
B W	[illegible]	50 do do	1600	
	Charges		2.50	
	Extra drayage to Mt Clare Depot		1.50	3200
			$24.00	

AN OLD BILL OF LADING

"there is a meeting of the holders of bills against the Government called to take place in Washington on June twenty-third,"[1] which meant delayed payments for powder. Iron and coal mines were being discovered and blasting powder was wanted. The construction of canals and railways required it, and the mills were worked to their full capacity to supply all the demands. With new interests and new industries came new difficulties and disagreements. In 1842 Alfred du Pont writes, "Our political dissensions are such that it would require the enemy at our doors to induce us to make proper preparations for defence."[2] Three years later the enemy was at the door, or perhaps it is fairer to say we had knocked at the door of the enemy, who was as unready as ourselves.

War between the United States and Mexico began early in 1846. A few weeks later a firm in Havana ordered two hundred thousand pounds of powder. Alfred du Pont suspected that it was for Mexico and went to Washington to consult the President; at his request and that of "the Secretaries"[3] the

[1] Wm. Kemble to Alfred du Pont, June 18, 1842.
[2] Alfred du Pont to Wm. Kemble, July 12, 1842.
[3] See letters from Wm. Kemble in June and July, 1846.

order was declined. Mr. du Pont wrote to the would-be purchasers, "However unjust our proceedings may be, and however shameful our invasion of Mexican territory, we cannot make powder to be used against our own country." [1] Another effort was equally unsuccessful: "Two gentlemen, a Frenchman and a Spaniard, the former giving his name as being Desaché, have applied for two hundred thousand pounds of powder, terms cash, and they refer to S. Morris Waln of Philadelphia and to Harmony and nephew of New York City. They denied the powder being wanted for Mexico, but as I have every reason to believe that it is for that country a prompt and decided refusal was given." [2]

The war lasted two years, requiring constant effort from all three brothers to meet changing conditions in the requirements for army powder as well as in that for commercial uses. New explosives had often to be considered. The most interesting of these was offered them in 1846. A man named Schönbein patented in Europe and America a product which was called "cotton gunpowder," "explosive

[1] E. I. du Pont de Nemours & Co., to Morrison, De Carrick & Co., May 20, 1846.

[2] Alfred du Pont to Wm. Kemble, June 11, 1846.

cotton," "fulminating cotton," or "gun cotton." He offered to sell the rights to England and to France, but both countries refused it. Alfred du Pont, however, was sufficiently interested to make some gun cotton from a formula of his own composition. He wrote: "The discovery is brilliant and such as to create astonishment, but the introduction of gun cotton in common use must be the work of time, because the cost of preparing it is high and it will require years before the application of machinery to its manufacture can make it cheap enough."[1] That he found time to make a careful study of the new material before he rejected it is shown in a letter he wrote in answer to some of the questions that were coming from all the powder agents, who were much alarmed by newspaper accounts of the wonderful invention:

"The objections to gun cotton and all other preparations of the kind are such as to preclude its becoming suitable for gunpowder. I shall name a few, leaving out the cost which must under any circumstances be greater than that of gunpowder.

[1] Correspondence of E. I. du Pont de Nemours & Co., November 25, 1846.

"1st. The article is more explosive than propellant.

"2d. It yields much less gas than gunpowder and at a lower temperature; therefore any given amount of propellant power can only be obtained by a much greater strain on the gun than if powder was used.

"3d. The effect depending in a great measure on the quantity of common air contained between the fibres of the cotton, the compression in the gun barrel must have much influence, and no certainty can be expected in daily use.

"4th. It imbibes moisture with more rapidity than common powder and any moisture it imbibes has a very injurious effect, unless it is dried over previous to being used. Powder is generally used in charges competent to effect the purpose intended and these charges are graduated so that they will be fully efficient, even with one or two per cent moisture. This is done without risk; it is different with gun cotton for the least over charge endangers the barrel.

"5th. The propellant gases of gun cotton are very acid and corrode the interior of gun barrels rapidly.

"6th. Gun cotton if used in close places,

such as casements, between decks of ships, etc., would by the vapors of nitric and nitrous acid it yields make such place untenable.

"Many other reasons could be given which would at once convince any person that gun cotton cannot come in use for military purposes, but time will not permit; there is, however, a trifling experiment which will show the merit of the new article. Take a small lock between your thumb and finger, holding it with no more pressure than you would hold a pen in writing; fire one end and you will find that the fire will be cut off at the point of compression, the piece held between the fingers remaining unburnt; now, what dependence can be placed on a substance so easily effected by pressure? Any person who will fire gun cotton in the common vacuum of an air pump, will see at once that its power depends entirely on the common air contained between the fibres; it varying according to the vacuum, or otherwise according to the compression used in ramming down a charge, which amounts to the same.

"In flashing common gunpowder in a common air pump no difference can be seen between doing so when the bell is full of air, or when a good vacuum is obtained; but in burn-

ing gun cotton it is a very different thing, for in a bell where not more than two grains weight of powder could be burnt, fifteen or twenty of gun cotton could be exploded, the mercury in both instances standing a little below one and a half inches.

"ALFRED DU PONT" [1]

Many phrases in Mr. du Pont's objections suggest a belief in the future usefulness of gun cotton in some form. He had himself done much to improve powder-making. When he was twenty-five years old, his father wrote: "Alfred has just contrived a new instrument as simple as it is ingenious and has proved an interesting fact, which is that there is no relation between the strength and the quickness of gunpowder." [2] And a year later: "I am confident that my son Alfred has considerably improved the manufacture of our Sporting and Eagle powders"; adding, "Please, dear Sir, to receive my thanks for the gratification your letter gives me, which is the greater from the circumstance that it is to my son that the compliment is due." [3]

[1] Correspondence of Charles I. du Pont & Co., Dec. 29, 1847.
[2] E. I. du Pont to P. P. F. Degrand, August 10, 1823.
[3] E. I. du Pont to Colonel George Gibson, July 22, 1824.

Even after the administration of the business had become his first duty, Alfred du Pont was an active powderman, often in the mills, experimenting in the laboratory, and deeply interested in any discovery that could improve the manufacture. Thirty years of hard work wore him out as it had his father; in 1847 a severe explosion with a loss of eighteen lives was a serious blow to him; and in 1849 he began to find his burden very heavy. He wrote: "A fabrication of over ten thousand pounds of powder per day, and all the mills going the twenty-four hours through (fourteen of which are by lamplight) is no small care," [1] and, "We will this year have made over four hundred thousand pounds of powder more than in 1848." [2]

In 1850 Alfred du Pont gave up the management to his brother Henry, with whom began a new régime. Alfred had gone to school in Carlisle, Pennsylvania, and had afterwards studied in Philadelphia; but he had always been near home, had grown up on the Brandywine, and had worked with his father for seventeen years. Henry du Pont had gone from boarding-school to West Point; had then served

[1] Correspondence of E. I. du Pont de Nemours & Co., November 21, 1849.

[2] *Ibid.*, December 20, 1849.

in the Army, and had resigned and joined his brothers only five months before their father's death in 1834. He had worked loyally under Alfred and cheerfully accepted his decisions, but when his turn came to take command of the office after sixteen years in the mills, he brought all the efficiency of his West Point training to bear on the task before him. He studied the growth of the West and put new agencies wherever he believed that new markets might be created; he required the payment of old loans that had held over from his father's time; he conquered many of the difficulties of packing and shipping; he made economic arrangements with other powder companies and so avoided extravagant competition. He never ignored any complaint of the quality of powder, but he was not eager to experiment with new methods. He wrote to the various agents that he was satisfied that the powder could not be improved; the reduction of its price was to be the important consideration.

When Henry du Pont became head of the firm in 1850, the other partners were his brother Alexis and their nephew, Eleuthère Irénée du Pont, whose younger brother, Lammot, had just finished his studies and was in

the mills; he was not a member of the firm till the early part of 1857.

Alexis and Irénée du Pont were able, efficient, hard-working men. They built new mills, they supervised their workmen patiently and methodically and according to the best traditions of the firm. Irénée du Pont made a notable improvement by suggesting that powder be packed in metallic kegs instead of wooden ones, and experimented indefatigably until he found a suitable model, which was patented; apart from this he was, like his uncles, content to work by the methods to which he was accustomed.

The new management soon had its great opportunity. In 1854 the Crimean War demanded more powder than the mills of England and France could supply and large quantities were bought by the English Government from the Du Pont Company. The profits from this transaction so strengthened the finances of the firm that its members had no misgivings as to their safety during the panic of 1857, or the upheaval of the Civil War, though at that time they lost heavily through their Southern agents, and Government payments were long delayed.

In May of 1854 there occurred an accident which, happening as it did in one of the principal streets of Wilmington, attracted much more attention than if it had been more serious, but at a more isolated place. Three wagons containing four hundred and fifty kegs of powder exploded on their way to the Du Pont pier; the three drivers and twelve horses were instantly killed, as were two men who happened to be near by. While the cause of the explosion was never proved, it was probably the carelessness of one of the drivers. The newspapers were filled with very exaggerated accounts of its effects, and all through the country laws were passed prohibiting the carrying of powder through cities; a precaution of which every one recognized the wisdom, but which added immensely to the difficulties of the shippers.

Three years later, on the 23d of August, 1857, Alexis du Pont was superintending the dismantling of a mill in Hagley yard when the moving of a heavy bin caused a slight explosion from which the loose powder carried a spark to an adjoining mill. In his effort to put out the fire, Mr. du Pont gave no thought to the great danger. The mill blew up, wounding him fatally with several of his men. He lived many hours,

and in spite of great weakness and pain, insisted on seeing the men who worked in the yards; bidding each one in turn good-bye.

In 1858 Alfred du Pont died. Like his brother Alexis, his relations with the men in his employ were almost paternal in their interest and affection. A letter taken from his correspondence with one of the Company's agents perhaps best shows the gentleness of his nature and the reason for the grief of his men at his death: "Will you please oblige our Alfred du Pont by inquiring from Mr. West, the lumber merchant who assisted in procuring the boards he wanted, the name of the carpenter who so kindly assisted our A. du P. in selecting the boards? His name has escaped our memory, but his kindness and gentlemanly conduct have not; and he being fond of shooting, we wish to send him a few pounds of our powder as a slight return." [1]

Such a letter needs no comment — and his life was full of that kind of consideration and courtesy. He was never a robust man, and for the last eight years of his life he lived in the retirement of a semi-invalid, though at his death

[1] E. I. du Pont de Nemours & Co., to Z. H. Gooch, September 11, 1844.

he was only sixty years old. Even after he gave up his active place in the Company his knowledge and experience were always at the service of his brothers and were invaluable to his sons.

Henry du Pont and the two sons of Alfred du Pont were the only members of the firm after Alexis du Pont's death. The younger of them, Lammot, was as enthusiastic a powderman as his uncle was an astute financier. They developed the business with amazing rapidity, but always on a sure foundation. In 1853, four years after he had finished his studies, all questions of fault in the composition of powder, complaints of miners, and the like, were referred to "our chemist, Lammot du Pont," and his corrections and explanations were always adequate. In 1857 he was granted a patent that made possible the use of nitrate of soda instead of saltpetre for manufacturing blasting powder.

In 1831 Lieutenant Irvine Shubrick, of the United States Navy, was ordered to Chili, and at the request of E. I. du Pont, whose niece Lieutenant Shubrick had married, he investigated the newly discovered "Peruvian saltpetre." His report is interesting, and satisfied Mr. du Pont that, as powder was then made,

the nitrate would be of no use to him.[1] Lieutenant Shubrick's letter was dated from the "U. S. Ship Potomac, Valparaiso, November 18, 1832," and he wrote: "The saltpetre is produced in the province of Tarrapaca and embarked at the port of Iquique, a small port in the latitude of 21° 40′ south and longitude 70° 00′ west, a little more than halfway between this place and Callao. It is said here that its basis is nitrate of soda and unfit in the composition of gun powder, and that in France it is principally used for acids, glassware, soap, &c. It is thought that the province of Tarrapaca could produce as much as might be demanded for all Europe or any other destination, but the present establishments do not yield more than 80,000 quintals annually. The principal mines are about eight, ten and twelve leagues from the sea, and it may be said are productive from the surface of the earth. It is subjected to a simple process of purification which consists only in separating the salt from the earth. What is generally sold contains about four per cent extraneous parts, whereof one and a half and two per cent humidity. The quantity exported June, 1830, to the present

[1] See Appendix, p. 182.

time is computed at 90 to 95,000 quintals. The present price is $4 per quintal in bags delivered into the ship's boats, which in addition to the freight from this to the United States would make the cost greater than the amount stated in your letter of August, 1831. The saltpetre now is a regular business, and all French ships from this to France are freighted with it."

Lammot du Pont's discovery of a way of making powder from this unfailing source of supply so cheapened the cost of materials that his powder was in great demand at all mines. The resultant expansion of business altered the Du Pont policy of building no mills except those that the members of the firm could personally supervise.

The great market for blasting powder was in the anthracite coal fields of Pennsylvania, and inasmuch as the ever-increasing need of powder made new mills necessary, the logical place for them was nearer the market. Mills had been built in 1858 by Parrish, Silver & Co., in Luzerne County, Pennsylvania, on the Big Wapwallopen Creek, a tributary of the Susquehanna River, but were not successfully operated. A year later they were bought for the

purpose of making Lammot du Pont's new soda powder, and were rebuilt and managed under his direction. Once before the company had controlled an outside plant — E. I. du Pont had built one in Louisiana in 1804 in order to make a place for a troublesome employee, but in 1811 the man died and the money invested was lost. Several capitalists suggested to Mr. du Pont after the War of 1812 that they were willing to invest in mills to be built near Washington, but the Louisiana venture had convinced him that the successful management of one plant required all his energy, and he refused even to consider another. "Wapwallopen" was bought, however, not from an effort to create a new market, but to supply more economically a market that was rapidly growing and constantly clamoring for supplies. It was not a large factory with its output of thirty-five thousand kegs a year, but it marked the beginning of a new condition. The mills on the Brandywine were insufficient; for the future there must be considered not only the economic shipping of powder, but the possibility of building plants in such localities that the difficulties of transportation would be lessened. Visitors to Wilmington were inclined to

smile at the teams of six mules which drew great wagons loaded with powder as far west as Pittsburgh — a six weeks' journey — long after railways were carrying every other kind of merchandise, but there were many times when in no other way could powder be carried. Railways often refused to take it, or, worse, announced that for the safety of the road "friction matches will not be carried except in the cars that carry gunpowder"; [1] canals froze and for months the boats did not move; nervous captains of coasting schooners would not have powder on their boats, or, as often happened, threw it overboard if a thunderstorm threatened. The mules, however slow, were sure.

In 1858 Lammot du Pont spent three months in Europe in order to visit the manufactures, arsenals, etc., in England, France, and Belgium, all of which had been more or less modified by the experience of the Crimean War. He came back filled with eagerness for the improvement of munitions of war in this country, and for some years he worked in coöperation with Major Hagner and Captain Rod-

[1] E. I. du Pont de Nemours & Co. to B. T. Elder & Co., February 23, 1853.

man, all three of them giving their utmost knowledge and ingenuity to make a military powder that should be the best in the world.

The development of special powders for large ordnance began about 1852, when Captain Dahlgren suggested that coarser powder than was then being made would be more efficient for the Navy guns. The size of the grain was materially increased, but it was not until 1859 that officers of the Army became satisfied that the powder must be radically changed, in order to be adaptable to the new guns. Henry du Pont advised powder grained to one inch in diameter, and presumably it was tried; but Captain Rodman was not satisfied with the result, and he experimented with various kinds of powder at the Frankford Arsenal. On November 22, 1860, he wrote that he wanted the Du Pont Company to make "for guns of 24 lbs. and over, cartridges composed of perforated cakes of powder from one to two inches thick — each cake to be in diameter about one quarter of an inch less than the bore of the gun in which it is to be used. In very large guns the cakes may be made hexagonal instead of circular, in which case seven cakes would form a layer — this was the form of cake used in the

15 in. gun.[1] In the cakes used in the 15 in. gun the holes were one quarter in. in diameter and .6 in. apart from center to center, leaving the walls of powder between the holes about .35 in. thick. This thickness of walls was too great even for the 15 in. gun, as the powder was not all burned in the gun. I do not see why your incorporated materials, in the same form as they go to the ordinary press to be pressed into cakes for graining, would not be suitable for entering the moulds for being pressed into perforated cakes. If this would answer, it would save the expense of pressing into cakes and of granulation or mealing. The cakes used in the 15 in. gun were made of ordinary cannon powder after the addition to it of about 3 per cent of moisture. It worked perfectly well."

Doubtless Captain Rodman's powder did "perfectly well" for experimental work, but it was long before the proper composition and machinery could make it in quantities for war needs. Six months after that letter was written, and while he and Lammot du Pont were working to perfect his "cakes," South Carolina seceded; and in April of 1861 the country was at war. There was no time then for making ex-

[1] In his own experiments at the Frankford Arsenal.

periments; the Government had no proper supply of munitions; and new inventions had to wait for their development till immediate needs had been met.

CHAPTER VIII

1861–1865

THE election of Abraham Lincoln in November of 1860 was a very definite notification to the Southern States that a majority of the citizens of the United States opposed the extension of slavery. In December South Carolina seceded from the Union; in February Jefferson Davis was inaugurated as President of the Southern Confederacy; in March he ordered that an army of one hundred thousand men should be raised. But it was not till Fort Sumter was taken by the Confederate forces in April, 1861, that any preparation seems to have been made by the Northern States either for an army or for munitions for the struggle which no one expected to last more than a few months — and which racked the country for four years.

Two days after the fall of Sumter the Du Pont Company again gave proof of its loyalty to the Government in a letter to the Richmond agent: "With regard to Colonel Dimmock's order we would remark that since the inaugura-

tion of war at Charleston, the posture of National affairs is critical, and a new state of affairs has arisen. Presuming that Virginia will do her whole duty in this great emergency and will be loyal to the Union, we shall prepare the powder, but with the understanding that should general expectation be disappointed and Virginia, by any misfortune, assume an attitude hostile to the United States we shall be absolved from any obligation to furnish the order."

In May, 1861, Henry du Pont was appointed Major-General of the forces in Delaware, a position for which his West Point education had well fitted him. The situation of the mills in a State of which the loyalty was at first doubtful, and their value to the Government, made it imperative that they should be intelligently protected; for that purpose two companies were organized from the men employed by the Du Ponts; their captains were Lammot du Pont and Hugh Stirling. In July, 1863, an effort was made by the Confederates to seize the Philadelphia, Wilmington and Baltimore Railroad at a point between Philadelphia and Baltimore. A troop of cavalry reached Gunpowder Bridge, in Maryland, but was driven

back by Delaware troops, the Du Pont companies among them. A year later one of the Du Pont companies was sent to help guard the railroad which was again threatened. Confederate raids were not the only danger; on one occasion two men, who proved to be disguised officers from the Southern army, were stopped within half a mile of the mills. In the four years between 1861 and 1865 there were seven explosions from "unknown causes" in which thirty-nine men were killed and much powder and machinery destroyed. Such catastrophes occur so much less often in times of peace, and are so helpful to the enemy in times of war, that one hesitates to use the word "accident" in describing them.

The Southern States were importing excellent English powder, and in order to make an explosive that should be better than that of the enemy, Lammot du Pont, reënforced in 1861 by his cousin, Eugene du Pont,[1] worked night and day; but their experiments soon had a serious interruption.

The Government had very little powder and could not pay for any until special appropriations were made; whereas all the raw materials

[1] The eldest son of Alexis I. du Pont.

had to be paid for in cash. Late in 1861 there was but a small quantity of saltpetre in America and it was feared that England's sympathy with the Confederacy might result in closing the East India market to the Union. The Du Pont Company could not possibly buy enough saltpetre to assure their supply in such an emergency, and in November Lammot du Pont went to Washington to explain the situation to the Secretaries of War and of the Navy. They authorized him to go at once to England and buy a large quantity of saltpetre for the Government. To avoid publicity it was all to be purchased in the name of the Du Pont firm and by their usual brokers. Mr. du Pont reached London on the 19th of November, 1861. He had some trouble about his credit, for he was known only at Brown, Shipley and Company, and without notifying him, the Government funds on which he was to draw had been sent to Baring Brothers. When that difficulty was overcome, he bought in one day for the United States Government and his own firm all the saltpetre that was for sale in England — about two thousand tons, and much that was on its way from India; arranged for ships in London, Liverpool, and Greenock; and

began loading his cargoes on the 28th; nine days after his arrival.

In the meantime the British Government was informed that Messrs. Mason and Slidell, Commissioners from the Confederate States on their way to England, had been taken from an English vessel, the Trent, and imprisoned in Boston on November 19 in defiance of international law, but with the approval of the United States Congress. The immediate surrender of Mason and Slidell was demanded by England; and an embargo on the exportation of saltpetre stopped Lammot du Pont's cargoes before they were loaded. There was nothing for him to do but return home at once; letters were uncertain and there was no other means of communication. He sailed on the 7th of December and was again in Washington on the 26th; there he was given a letter from the Secretary of State urging Charles Francis Adams, the American Minister in London, to do all in his power "for the relief of E. I. du Pont de Nemours and Co." He sailed again for England on the 1st of January, 1862, as did Mason and Slidell, the American Government having admitted the impropriety of their seizure. Mr. du Pont wrote from England on the 13th that the embargo would

probably be removed within a week. It was removed on the 18th; the interrupted loading was resumed, and, the political crisis having passed, Mr. du Pont arranged for the sale in England of some of the saltpetre bought for his firm. He returned to this country, sailing from England on the 1st or 2d of February, 1862, and arriving in Wilmington on the 15th. The first of the vessels carrying the saltpetre sailed on the 2d, the other four soon after.[1] The secrecy of the whole transaction and Lammot du Pont's hurried and unexplained journeys were perhaps some excuse for the very remarkable accounts of it that have found their way into print — accounts for which Mr. du Pont was certainly not responsible, but of which many were too grotesque to be worth contradiction. It was a very important mission to entrust to the youngest member of the firm, and was accomplished so successfully that in less than a year the Government again authorized the company to buy saltpetre; but conditions had changed and the purchase was left to their London brokers.

As soon as he had returned from England,

[1] The amount paid by the Government for this saltpetre was £79,699, 16*s* 8*d*.

Lammot du Pont was again experimenting for the improvement of both military and blasting powder; he made frequent journeys to Washington, New York, and Wapwallopen, where he supervised all the work; and in May, June, and July, 1863, he was on duty with his company of Delaware militia. In August, on his way from Wapwallopen to New York, he was suddenly taken ill and hurried home, where for two months he suffered a severe attack of typhoid fever. When he was considered convalescent his eyes became troublesome, and another month passed before he could get back to active work. Then he tried to make up for lost time with the not surprising result that he was in bed with an acute attack of rheumatism in June and July of 1864.

When war was declared Henry du Pont wrote to one of the agents, "The extra demand for powder for war purposes will not equal the regular demand which would have existed had peace continued."[1] There can be no doubt of the correctness of his prophecy. Of course no explosives could be sent to the Southern or Southwestern States, where the Du Pont

[1] Correspondence of E. I. du Pont de Nemours & Co., May 6, 1861.

agents had sold large quantities of both blasting and sporting powder. None could be exported from New York or Philadelphia, lest it should be captured at sea and used to supply the Southern armies; this order cut off shipments to the West Indian Islands and Mexico, and for a time those to California, where since 1849 an important agency had existed. The miners of the Western coast had no other means of getting their powder, and by October, 1863, the situation had become so critical that the Collector of the Port of San Francisco telegraphed the Secretary of War that unless powder was sent promptly the supply of gold would stop. Before the needs of the market could be met, California capitalists had raised one hundred thousand dollars and organized the California Powder Works, which, with Chinese labor and saltpetre brought from India across the Pacific Ocean, took much of the business from the Eastern manufacturers.

The difficulty of getting saltpetre again became serious. Lammot du Pont's purchases in England were for supplying powder for a war that might last for six months; by 1863 the stock was exhausted. When a pound sterling was valued at thirteen dollars and all saltpetre

came from the English market, some other means of supply became imperative. Lammot du Pont's nitrate of soda powder made saltpetre unnecessary for blasting, but there was nothing to take its place for military powder. Samples of "nitrous earth" were sent by agents from Tennessee and Missouri; two caves of such earth "several miles in extent" were for sale in Mexico; a mine in Tennessee that "will give five tons a day" was offered for four hundred thousand dollars; but the samples were not satisfactory, and in May, 1863, Henry du Pont wrote to the brokers in Calcutta who ordinarily supplied the Company: "The manufacture of saltpetre has been commenced in this country in several places; at the present high rates for East India nitre it will pay well; the article being made by chemical decomposition, it comes out pure, which is a great advantage." A year later he wrote: "The manufactured saltpetre is made from nitrate of soda and potash. It sells at the same price as East India saltpetre. It is not popular with powder manufacturers, but when saltpetre is scarce it sells pretty well."[1]

[1] Correspondence of E. I. du Pont de Nemours & Co., October 30, 1864.

In March, 1862, Lammot du Pont went to Washington in an attempt to modify a bill for the taxation of gunpowder which had also a clause providing for the manufacture of powder by the Government. It was not a new idea. Many years before then Alfred du Pont wrote: "We notice in the President's message the recommendation of erecting powder works, but not having yet seen the report of the Secretary of War, we cannot exactly know the reasons that have induced the Department to recommend this measure. We can only say that if the expectation is to save expense, they will find themselves greatly deceived."[1] Though the powder was taxed in 1862, the Government powder works were not heard of again, but Henry du Pont was very indignant at the suggestion that the Government could, with inexperienced men, make powder that would be better or cheaper than that furnished by the Du Pont firm, and he wrote to Captain Harwood: "The market price was twenty cents in December when we supplied the Government at eighteen cents; the present price compared to current rates of trade is two dollars a barrel

[1] Correspondence of E. I. du Pont de Nemours & Co., December 8, 1837.

better for the Government than it ought to be by present prices of materials. There is no country in the world where the Government obtains its powder on as favorable terms as in the United States. When our Mr. Lammot du Pont was in England in January and February last, the British Government was paying its contractors, in time of peace, eighty shillings per hundred pounds for cannon powder, one hundred and ten for musket, one hundred and twenty for rifle — a good deal above the war prices here; the British manufacturer having the benefit of free saltpetre and brimstone, while the American manufacturer pays a heavy duty on both."[1]

Prices and taxes kept increasing, and in November of 1863 the price to the Government had reached twenty-six cents a pound; at that point the Assistant Secretary of War wrote to ask Henry du Pont whether it was possible to bring powder from England. He was told that the English firms that supplied their Government would undoubtedly sell to the United States at thirty-four cents a pound for cannon and forty cents for musket powder, exclusive of

[1] Correspondence of E. I. du Pont de Nemours & Co., June 17, 1862.

shipping charges; but he was also informed that the sizes and specifications of English powders, which differed from those required in America, would cause much confusion. In March, 1864, Henry du Pont wrote to General Ramsay: "There never has been a case in any country in the world where a nation at war has had its powder so cheap as the United States have had it since the breaking out of the Rebellion; and now at this time, with a specific duty of two cents per pound on saltpetre and of six dollars per ton on brimstone, and a Government tax of one cent per pound on powder, the United States are getting the powder cheaper than England pays for her powder, where saltpetre and brimstone are both free and where labor and all other elements are much lower than in this country."

In April, 1864, a resolution in Congress added fifty per cent to the duties affecting powder and the price of Government powder was raised to thirty cents. General du Pont, in his letter of explanation, said:[1] "From 1861 to the present time saltpetre has advanced 135 per cent; brimstone, 80 per cent; charcoal, 50

[1] Correspondence of E. I. du Pont de Nemours & Co., May 26, 1864.

per cent; cooper work, 90 per cent; labor, 75 per cent."

Low as were the prices asked for Government powder, the Treasury Department was unable to make immediate payments, and though the bills were promptly audited and approved, the drafts were slow in coming. As all materials, taxes, and labor had to be paid for in cash, the situation was a grave one for the manufacturer. In March, 1862, Henry du Pont wrote to the Ordnance Department: "We have received no payments since October, and saltpetre is selling only for cash. We need funds badly." In April: "We are very much in want of funds; there is due on the November account $7770 and all that has been audited since. We understand that the Treasury is paying twenty per cent demand notes and eighty per cent certificates of indebtedness, which would be very acceptable." Between April and the end of July the company received about $360,000, but nothing more for many months. In July, 1864, powder furnished in August, 1863, was still not paid for, and in October, "The Government owes us over $350,000 for the Army alone." In August of 1865 the Secretary of the Treasury offered payment of all the bills — twenty-five per cent

in cash and seventy-five per cent in certificates of indebtedness, which was cheerfully accepted.

The four years of the war were very hard ones for all the members of the firm; two of them — Henry and Lammot du Pont — had suffered severe illnesses, but they had surmounted every difficulty with unshaken courage. Though great fortunes had not been made, the company had gained immeasurably in prestige and in experience and had laid a foundation of great strength for new activities.

CHAPTER IX

1865–1877

AT the close of the Civil War the members of the firm were Henry du Pont and his three nephews, Eleuthère Irénée and Lammot, sons of Alfred du Pont, and Eugene, the eldest son of Alexis.

As soon as it was possible to travel in the south, George Breck, a relative of the Du Pont family, was sent through that country to investigate the business conditions of the Southern States and the standing of the various Du Pont agencies. His report confirmed Henry du Pont's belief that the sale of powder to the Government in time of war would not be as profitable as the earnings would have been had peace continued. All through the South agents had accepted Confederate money or bonds in payment for powder, and the banks in which their deposits were made refused payment in United States currency. Some few agents had bought cotton with the money they had, but few were so far-seeing, and the losses were very heavy. Powder valued at over twelve thousand

dollars was taken from the State Magazine in Missouri for the use of the Confederate armies, and was still unpaid for in 1870.

When the war ended, the Government asked to be released from all powder contracts. The Du Pont Company at once agreed to have them cancelled at no cost to the Government and resumed the manufacture of blasting powder, for which agents were clamoring from all parts of the country. Between 1860 and 1870 over twenty-two thousand miles of railway were built in the United States; work on the Pacific Railroad began at both ends in 1863. The demand for powder for coal and iron mines as well as for the construction of the roads was enormous. Partly because the large mills — Hazard, Laflin, and Rand, and Du Pont — were fully employed in supplying the Army and Navy, and partly because of the difficulty of transportation, small and poorly equipped mills had been put up near the mines, and having no agents and no freights to consider, they were able to sell blasting powder at a great reduction from former prices. Few of them had made any allowance for losses by explosion, and after short and disastrous experiences many were glad to sell their machinery to the larger

companies or to increase their capital by issuing stock to those companies in order to profit by their greater knowledge.

The spirit of speculation and competition which was driving the whole country to a condition that culminated in the panic of 1873 was particularly disorganizing to powder-makers; agents of different companies were continually selling at a loss rather than let another company have a customer; sometimes agents of the same company underbid each other. Railroads usually gave lower freight rates to the company from which they could most cheaply buy the powder used in their construction work.

In this very uncertain market a new and unexpected competitor appeared. The Government, in addition to the powder left from the war and that taken in Confederate magazines, was constantly receiving new supplies from firms that had refused to cancel their war contracts. It had formerly been the custom of the Army and Navy Departments to give old powder in part payment for new; but the great quantity on hand and the industrial demand for explosives suggested a more summary method, and in 1866 large quantities were offered for sale at public auctions. In April of

that year Henry du Pont wrote: "The policy pursued by the Navy Bureau in crowding immense quantities of powder, by auction, on the market has completely broken down the trade."[1] In 1866 Du Pont agents were sent to sales at various arsenals where about forty thousand barrels of powder were sold — the whole amount sold was much larger. The situation was so serious for every one concerned that an agent was sent to Washington to try to make a better arrangement, but his report was not encouraging: "I had a talk with Captain Crispin this morning. He says he can see that it would be to the interest of the Government to have their powder handled by one large concern; but he does not think there is a man in the entire department, from the Secretary of War down, that would dare to make such an arrangement. I told him that was the only way they could get a fair price for all their powder; they might find parties who would take a few thousand barrels at what would appear to be better terms, but they would create a competition against themselves. That if the Government was going to sell powder that way

[1] Correspondence of E. I. du Pont de Nemours & Co., April 16, 1866.

it would be more to your interest to stand aside and let other parties buy it."[1] Other parties were very glad to buy it: "Your old friend Goodwin of the Empire Mills bought 1000 barrels of Government powder at St. Louis at $7\frac{1}{2}$ cents and shipped it to Pittsburg, so look out for a raid on prices at that point. The powder delivered on board the barge at $7\frac{1}{2}¢$ by General Callender."[2]

In 1868 Colonel Hazard told General Dyer, of the Ordnance Department, that "the large quantities of powder offered at St. Louis at the last sale (16,247 barrels) broke down the market and caused a heavy loss to manufacturers as well as to the Government."[3] A week later General Dyer was told that "at the Charlotte sale the Du Pont Company paid for powder and got a general assortment of percussion caps, fuses, ends of rope, old nails, spikes, paper and brass balls";[4] and that "it was not just the thing for the Government to compete with us

[1] F. L. Kneeland to E. I. du Pont de Nemours & Co., July 7, 1866.

[2] J. M. Boies (of Laflin, Boies, & Turck) to F. L. Kneeland, June 10, 1868.

[3] F. L. Kneeland to E. I. du Pont de Nemours & Co., January 14, 1868.

[4] F. L. Kneeland to E. I. du Pont de Nemours & Co., January 31, 1868.

for our retail trade. It is hard enough to contend with the depression in business and high taxes, without having the competition of the Government in addition."

That same year Pope, the secretary of the Hazard Company, told a Du Pont agent that the Hazard Company had recently bought Government powder and that "it was found to contain percussion caps, nails, stones, chippings of lead and pieces of iron from inside shells. The workmen were so fearful of it that they dumped it all into the river, which is what the Government ought to do with the whole of it."[1]

The complaints, however, were not all of that kind. Much of the auctioned powder was very good. Cannon and musket powder for which the Government had paid thirty cents a pound, and which it sold for from five to twelve cents, was quicker and easier to handle than blasting powder costing twenty-two cents a pound; and the agents' letters were filled with the complaints of the miners when they could not get the better and cheaper powder.

These public sales lasted till 1872, when

[1] F. L. Kneeland to E. I. du Pont de Nemours & Co., August 4, 1868.

Henry du Pont wrote: "On inquiry from the Department at Washington we learn that there will be no more condemned powder sold at public sales. There is still, however, some on hand which the Government will exchange for good powder."[1] This was done at a ratio of about one to four for some years. The Du Pont Company was still reworking Civil War powder in 1890.

Though the public sales of powder were discontinued, there were many private sales. In March, 1878, the Government had for sale at St. Louis 832,000 pounds of cannon and musket powder.[2] J. W. King had been an official of the Miami Powder Company of Ohio; he quarelled with its directors and, with the powder that was for sale so conveniently near by, declared war on the Miami Company. King's Great Western Powder Company was organized near Cincinnati in August, 1878; but a month earlier Henry du Pont wrote: "King's Rifle powder is old condemned powder such as is sold for blasting; he purchased it at the St. Louis Arsenal and has redried and reglazed it.

[1] Correspondence of E. I. du Pont de Nemours & Co., December 16, 1872.

[2] F. L. Kneeland to E. I. du Pont de Nemours & Co., March 29, 1878.

It is an inferior article. We have often bought it at Government sales and sold it for blasting powder. He has a very small mill, makes some blasting powder but no rifle, — but fills his rifle trade with this old Government powder."[1] And seven years later: "Prices of powder have been demoralized by the war between the Great Western Powder Company and the Miami Powder Company."[2] Either the Great Western Company had provisioned itself well for *the war* or it made very large profits, for it continued its depredations on the regular market until the death of King in July, 1885. The new manager, G. W. Peters, a son-in-law of King, did not carry on the feud.

With so many difficulties to overcome, it was obvious that if any profit was to be made by the manufacture of powder the materials must be bought and the product sold more carefully than had hitherto been done. For that purpose the larger companies agreed among themselves not to outbid each other in buying saltpetre or nitrate; not to attempt to sell in territory that could be more economically reached by another

[1] Correspondence of E. I. du Pont de Nemours & Co., July 29, 1878.

[2] Correspondence of E. I. du Pont de Nemours & Co., July 13, 1885.

company; and above all to stop the ruinous competition of their agents. Their intention was not to force prices up or down, nor was any company made to suffer for not joining them. They were simply making the best arrangement that seemed possible to allow each manufacturer to deliver his product at the least cost to both himself and the purchaser. Even with these economies it was hard to earn any profit. In 1868 Smith and Rand reduced their dividend from five to three and a half per cent. In 1870 the Oriental Powder Company failed because of heavy indebtedness, high cost of materials, and competition. It struggled on a little while, was sold at auction in 1872 and was reorganized.

In 1873 all business in this country was in a most critical condition. Speculative buying had reached unprecedented heights — and fallen. The great failure of Jay Cooke and Company carried other bankers with it; and railways and mines were forced to stop work. In 1877 Henry du Pont said, "More than half the powder machinery in this country has been lying idle since the panic of 1873."[1] Only the fittest could sur-

[1] Correspondence of E. I. du Pont de Nemours & Co., March 17, 1877.

vive, and they by the greatest effort. In 1875 a man wrote to ask the Du Ponts for a place as engineer and was told: "We build our own machinery; draw our own plans; make our own patterns; and have never employed any one to design or construct our mills or machinery, dams or races, roads or anything else; being our own engineers and superintendents of all work done at our mills, both here and in Pennsylvania."[1] That is the true explanation of the growth of the company in those most trying times. Their agents could not always be trusted; many of them succumbed to the mania for speculation, and losses through them were very heavy. But the manufacturing part of the business was wholly in the hands of those whose name it bore and they were willing to make every personal sacrifice that it might succeed.

The President of the Hazard Powder Company died in 1868, leaving to his family a large fortune all invested in railways. A few months later the New York agent wrote: "The death of Colonel Hazard has effected the standing of their Company in the trade very seriously. It is

[1] Correspondence of E. I. du Pont de Nemours & Co., November 22, 1875.

reported that the Company is falling to pieces. I think they are badly in want of business ability."[1] A serious explosion in 1871 was a severe blow to their credit, and in 1874 they were said to be in need of both money and orders. In 1876 the Hazard Company was quite willing to sell a majority of their stock to the Du Pont Company, with whom they had always been on very friendly terms.

An interest in the California Powder Works was acquired at about the same time. Because of the impossibility of sending powder to California at the beginning of the Civil War, when it was greatly needed for the gold mines, a set of mills had been built in 1861 at Santa Cruz. Having Chinese labor, and saltpetre and nitrate directly from India and Chili, they manufactured about four thousand kegs a month with some success. They made only blasting powder, and at first only expected to work until the market could be supplied by the Eastern manufacturers. As early as 1864 troubles with the machinery and with labor had discouraged the stockholders, and in 1867 one of them offered the Du Pont Company his shares

[1] F. L. Kneeland to E. I. du Pont de Nemours & Co., December 12, 1868.

of the stock, amounting to twenty thousand dollars. His offer was declined, but the next year the Du Ponts were offered shares by two other shareholders. The Du Pont Company then instructed their San Francisco agent to investigate the California Company — the value of its land and buildings, its capital, etc., and as a result bought much of its stock, though until 1877 the Du Pont Company's interest was not large enough to ensure the coöperation of the California Company.

The experiments with cannon powder that were so engrossing to Captain Rodman and Lammot du Pont before the war were not seriously resumed until 1870, and then by Lieutenant Dutton, who had Captain Rodman's former place at the Frankford Arsenal. At first only the composition of the usual Mammoth powder was considered — ordinary black powder grained to about an inch in diameter — but the perforated cakes that Captain Rodman had suggested were remembered, and experimental moulds for them were made. These moulds, made of bell metal, gave much trouble, for they did not keep their dimensions under pressure, and the density of different cakes was uneven. The solid cakes were sent to Frankford and

perforated with a drill that Lieutenant Dutton adapted for the purpose.

In 1872, the moulds having proved impracticable, Lammot and Eugene du Pont together applied for a patent in the United States, England, and France "for compressing dampened powder in sheets between ribbed plates or other mechanical equivalent for forming indented lines, by which the cake is broken up into uniform shapes or sizes, and the giving of these grains a greater density on the surface than in the interior."[1] Lammot du Pont had in 1865 patented a horizontal press for the compression of powder and also the hard-rubber plates used in it. The Du Ponts were so sure of the value of the ribbed plates that they at first intended to have their rights patented in Germany also. This plan was discouraged by their lawyer, whose letter on the subject is interesting: "In Germany there is so much uncertainty that I consider it my duty to first inform you of it before you incur the expense of an application there. My experience in procuring patents in Germany is that they refuse everything that the Government wants to use, and your inven-

[1] E. I. du Pont de Nemours & Co. to A. B. Stoughton, August 25, 1873.

tion is right in their line. Beside, their system is so defective and their commissioners so corrupt that you must either buy or get personal influence before you can obtain the patent. And after you have a patent the Government will use it if they want it and without paying a farthing for it."[1]

Samples of hexagonal and octagonal powders were ready for the Government to try in January, 1873. The new powder could not be made quickly. All of it was gone over by hand and imperfect grains were taken out; "the production per month will fall far behind that of the old style Mammoth powder, but we believe the loss in production and the increase in price will be amply compensated by the results obtained."[2] Samples were also sent of what was called square powder; "the horizontal section is square and the vertical section an octagon"[3] — but it never seems to have got beyond the experimental stage. In the following December the Government ordered four hundred and fifty barrels of hexagonal powder for the Navy

[1] A. B. Stoughton to E. I. du Pont de Nemours & Co., September 9, 1873.

[2] E. I. du Pont de Nemours to Major Bayler, April 25, 1873.

[3] Correspondence of E. I. du Pont de Nemours & Co., August 18, 1873.

and five hundred for the Army, beside one thousand barrels of ordinary Navy cannon powder; and very soon after that, the English Government ordered two thousand pounds of the hexagonal, probably in order to compare it with "an analogous powder"[1] made by an English firm for that Government, at nine cents a pound more than the Du Pont price.

Eleuthère Irénée du Pont, the eldest grandson of the founder of the Company, died in September, 1877, after an illness of many months. He was only forty-eight years old, and had been a member of the firm for twenty-six years. When Alfred du Pont resigned in 1850, Henry du Pont took entire charge of the office, leaving the care of the mills to his brother Alexis with their nephews Eleuthère Irénée and his brother Lammot. Seven years later Alexis du Pont was killed in an explosion and the mills were managed by Irénée and Lammot alone, until in 1861 they were reënforced by Eugene du Pont, then twenty-one years old. They superintended the entire manufacture of both the Brandywine and Wapwallopen mills until Francis G. du Pont, Eugene's younger brother,

[1] Correspondence of E. I. du Pont de Nemours & Co., December 8, 1873.

joined them. Lammot du Pont was in Europe for three months in 1858 and for a shorter time in 1861. When he was nominally at home his share in the management often called him to Wapwallopen, New York, or Washington. The chemical work in which he was so successful kept him in the refinery and the laboratory very constantly. Those buildings were in the original enclosure — the "Upper Yard," which in 1866 had a capacity for producing five thousand pounds of sporting powder a day. Lammot and Eugene du Pont practically confined their supervision of the Brandywine mills to this yard, leaving the rest of the manufacture to Irénée and, after 1871, Francis G. du Pont.

"Hagley Yard," bought in 1812 and often extended, could make twenty-five thousand pounds of blasting powder a day in 1866; and within its boundaries were the machine and millwright shops, the carpenter and blacksmith shops, keg factory and packing house. The "Lower Yard," begun in 1847, on the opposite side of the Brandywine and nearer Wilmington, had an output of five thousand pounds of sporting powder a day. A circular, printed in 1872 for the information of their agents, shows that the Company made twenty-

four kinds of gunpowder and seventeen kinds of blasting powder, and sold as by-products refined saltpetre, sulphur, charcoal, and also safety fuse.

Irénée du Pont's responsibility, therefore, was very great. Day after day for twenty-seven years he was with the powdermen, looking for opportunities for improving the efficiency of the machinery or adding to its safety. He was always one of the first on the ground after an explosion, and he never permitted a new or a rebuilt mill to be operated until he himself had run it. During the Civil War all the mills worked on Government powder, and the care and the constant anxiety and frequent accidents gave him little rest. The men who worked for him told stories of his generosity and his courage for many years after his death. His few friends loved and admired him. But he never left home except for short business trips; he put all his strength into his daily work, and died as a result of the exposure and fatigue.

CHAPTER X

1878–1889

HENRY DU PONT'S elder son, Henry A. du Pont, was, like his father, a graduate of West Point. He was given the Congressional Medal of Honor and the rank of lieutenant-colonel for distinguished gallantry in the Civil War, and he remained in the Army until after his marriage in 1874. For many years his father had urged his return to Delaware; more men were much wanted in the management of the Company; but Colonel du Pont was devoted to his profession and postponed his resignation until his wife's desire for a settled home was added to his father's need of his help. He became a member of the firm in January, 1878, at the time of the readjustment that followed the death of the second E. I. du Pont. Colonel du Pont was assigned to duties in the office — he had had much administrative experience at various army posts — and it was believed that he could relieve his father of part of the enormous correspondence. In 1876

Henry du Pont wrote in apology for an illegible phrase in one of his letters: "I have written so many letters in the last forty years — average about six thousand per year — that it has spoiled my penmanship." [1] There were times, undoubtedly, when he felt the need of help, but when it came to the point he was quite unwilling to give up any part of his accustomed task. Colonel du Pont's share of the office work was not sufficient to fill his time, and by degrees business arrangements that involved trips to New York were assigned to him, as were all railway arrangements and discussions with the officials of other companies. As a result of his knowledge of railway methods, he became President of the Wilmington and Northern Railroad in addition to his duties with the Company.

In 1878 Henry du Pont's younger son, William, seventeen years younger than Colonel du Pont, also became a member of the firm, and was given charge of all the farms belonging to it — no small task, for farming was the one relaxation that Henry du Pont and his father before him had permitted themselves, and by

[1] Correspondence of E. I. du Pont de Nemours & Co., August 5, 1876.

1878 "the farm" covered many hundreds of acres.

Neither of the new men had any place in the running of the mills, and Francis G. du Pont had all the responsibility that he had formerly shared with Irénée du Pont.

In 1865 Alfred Nobel patented a process for making nitro-glycerine, thereby introducing an explosive infinitely more powerful than any previously used. Henry du Pont, always firm in his faith in the processes used by his father, had little patience with the reports that were sent to him of the wonderful discovery: "Since writing to you on the subject of Blasting Oil, we have seen an interesting article on the subject in the last number of the 'Scientific American,' taken from some European paper, which confirms the impression we had and proves that its use would be much more dangerous than gunpowder"; [1] and later: "We thank you for the slip containing account of the explosion at San Francisco. We think that will be the end of Nitro Glycerine in this continent." [2]

Other firms, however, did not dismiss the

[1] Correspondence of E. I. du Pont de Nemours & Co., March 5, 1866.

[2] Correspondence of E. I. du Pont de Nemours & Co., April 19, 1866.

subject so lightly. The London brokers who bought saltpetre for the Du Pont Company wrote: "After the recent experience in Germany of new explosives, it is probable that the use of Gunpowder will become less extensive for War purposes, whilst substitutes for blasting purposes also appear to be coming into more general use." [1]

The danger in handling pure nitro-glycerine was very great; newspapers had frequent stories of terrible explosions; and when in 1868 Nobel's own factory near Stockholm was destroyed with much loss of life and property, its importation or use was forbidden in both Belgium and England. But in that year Nobel patented a formula for dynamite which diminished the sensitiveness of the nitro-glycerine by introducing an absorbent.

Much experimenting was being done in the United States. The Oriental Powder Company made a "new explosive" and had a disastrous explosion, ending in their bankruptcy. "Dualin" was a dangerous explosive made by Rand.[2] "The California Company are selling in Colorado a new article which they call Hercules,

[1] Forbes, Forbes & Co., August 8, 1866.
[2] F. L. Kneeland, December 19, 1871.

which is Blasting Powder soaked in Nitro-Glycerine." [1] But Henry du Pont's distrust of all "high explosives" remained unshaken: "It is only a matter of time *how soon* a man will lose his life who uses Hercules, Giant, Dualin, Dynamite, Nitro-Glycerine, Guncotton, Averhard's Patent or any explosive of that nature. They are all vastly more dangerous than Gunpowder, and no man's life is safe who uses them." [2] He declined to buy patents for new explosives, though in writing to one inventor he admitted: "A powder is much wanted that will answer certain purposes and it must have the following qualities, 1. It must burn with intense quickness. 2. Large volume of gas. 3. Cheapness. 4. Not liable to spontaneous decomposition." [3]

In 1873 a letter that later on must have been embarrassing was written to the Pennsylvania Railroad warning them against carrying "any compounds of nitro-glycerine," adding, "We have sent circulars to all our agents cautioning

[1] Correspondence of E. I. du Pont de Nemours & Co., December 21, 1869.

[2] Correspondence of E. I. du Pont de Nemours & Co., March 14, 1871.

[3] Correspondence of E. I. du Pont de Nemours & Co., August 15, 1871.

them against allowing any such to be stored in our magazines." [1]

It was not until 1876 that there was any suggestion that the head of the company was weakening in his condemnation of the new explosives, but in that year he approved the manufacture of Hercules powder by the California Powder Works, in which the Du Pont Company was the largest stockholder; and he gave some advice concerning the manufacture of the necessary acids. In 1877 the California Works built a plant for Hercules powder near Cleveland, Ohio, because they found it could "be manufactured there ten cents per pound cheaper than in California," [2] and shortly afterward Henry du Pont wrote to an agent: "We know nothing about the prices of the Hercules powder; but please write or telegraph J. W. Willard, Hercules Powder Company, Cleveland, Ohio, and he will post you. On August 1st last he wrote to know if our agents could help in the sale of Hercules, to which we consented, provided they do not store it in our magazines. It is the best of all patent explosives." [3]

[1] Correspondence of E. I. du Pont de Nemours & Co., May 1, 1873.

[2] California Powder Works, September 16, 1877.

[3] Correspondence of E. I. du Pont de Nemours & Co., November 6, 1877.

It is not difficult to read between the lines of these letters that Lammot du Pont had been experimenting with the new explosives and that the day must come when any firm of which he was a member would do its share of the manufacture. He made plans for a dynamite plant to be built on the Wilmington and Northern Railroad, not far from Wilmington, but there was much opposition from other members of the firm, and the site was abandoned. On January 29, 1880, a very unenthusiastic announcement was made: "We are going into the high explosive business — that is, we are forming a company in which we are heavily interested to manufacture the same, and have not as yet fully determined on the name." In February Lammot du Pont went to San Francisco, presumably to discuss his plans with other manufacturers. In May press plates for making hexagonal powder were sent to the California Powder Works; these plates had been patented by Lammot du Pont and were in use only at the Du Pont mills. Very shortly afterward the three companies — Laflin and Rand, Hazard, and Du Pont — who had subscribed equally for the new high explosives company, also bought the California Com-

pany's Hercules plant at Cleveland. All of which sounds like an exchange of courtesies helpful to both sides.

The Repauno Chemical Company, of which Lammot du Pont became president and William du Pont secretary and treasurer, had its factory at Gibbstown, New Jersey, at the junction of the Repauno Creek and the Delaware River, directly opposite Chester, Pennsylvania. Henry du Pont apparently became really converted: "As to blasting under water, we must frankly advise Nitro-Glycerine. We refer you to the Repauno Chemical Company. Atlas powder is the best and safest high explosive made." [1]

Though the plant at Cleveland built by the California Powder Works for their Hercules powder was bought by the same interests that provided the capital for Repauno, the name was not part of the bargain, and it was not till September of 1881 that the California Company agreed to allow the new corporation to be called the Hercules Powder Company. It was quite distinct from the Repauno Chemical Company, though it had the same officers and stockholders.

[1] Correspondence of E. I. du Pont de Nemours & Co., January 6, 1881.

In January, 1882, Lammot du Pont resigned from the Du Pont Company in order to give all his time to the Repauno Company, of which the office was in Philadelphia. He took over all the shares owned by the Du Pont Company; the rest of the stock remained with Laflin and Rand, and Hazard. His success was immediate and brilliant, and he laid the foundation of an enormous industry; but the end of his share in it came very soon. On March 30, 1884, Henry du Pont wrote to Bernard Peyton of the California Company, to tell him of the accident in which Lammot was killed, and his words are too graphic to be altered:

"We have just advised you by telegraph of the death of Mr. Lammot du Pont, who was killed by the serious accident which occurred about 10.20 A.M. yesterday at the works of the Repauno Chemical Company.

"Something going wrong in the Nitro-Glycerine house, the person in charge — Mr. Norcross, who was there with two workmen, sent for Mr. Hill, the chemist. Mr. du Pont, who happened to be at the works that day with Mr. Ackerson of the Laflin and Rand Co., went with Mr. Hill, as did Mr. Ackerson.

"All of these were at or near the house when

the explosion took place, and all were instantly killed by the shock; — the bodies being very slightly mutilated.

"The damage to the other buildings was practically nothing; a few panes of glass being broken and a few weather boards knocked off. The most serious part of the accident was the sacrifice of so many useful and valuable lives — but we will not enlarge upon this, knowing how thoroughly you will appreciate the magnitude of our loss.

"As nearly as can be ascertained about 2000 lbs. of nitro-glycerine exploded."

Lammot du Pont's death was an appalling loss to the firms with which he was connected. He was a brilliant chemist, a skilful and practical machinist, fearless almost to recklessness in experimenting, and he had an understanding of human nature that was of great value in the business world. He would have gone very far had he lived a few years longer. As it was, he probably did more for the development of explosives than any other one man.

After his death the Du Pont Company bought from his estate the greater part of his stock in the Repauno Company. Mr. Turck, the president of the Laflin and Rand Company,

was made president *pro tem.* of Repauno, "and nothing is done without full consultation with Mr. William du Pont, who represents us on the Board; Mr. Lammot du Pont's plans are being carried out just as he intended." [1] In a short time William du Pont became president of both Repauno and Hercules and the offices were moved from Philadelphia to Wilmington.

In the early years of the Du Pont Company the correspondence with its agents was the happiest part of the day's work. Victor du Pont, the New York representative of the Company, and his successor, Anthony Girard; De Grand in Boston; Cazenove in Alexandria; Pitray, Viel and Company in Charleston — all of them wrote to E. I. du Pont in the language that he loved, and their letters gave him the news of the day in America and Europe. Girard, a friend of Victor du Pont, was the New York agent from 1806 till 1823, when he retired from business and William Kemble took the agency. Kemble's letters — two or three of them every week until 1861 — were full of the business and politics of New York and are still most interesting. By 1861 the New York end

[1] Correspondence of E. I. du Pont de Nemours & Co., April 21, 1884.

of the work had become too important to be merely a side issue in Mr. Kemble's office nor could he give all his time to Du Pont business; he had for some years been supplemented by F. L. Kneeland, a salesman whose energetic methods recommended him to Henry du Pont. Kneeland was put at the head of a New York office of the Du Pont Company and given charge of all the shipping that went through that city and of all the agencies, which were increasing rapidly, in New York State and New England. He became invaluable to General du Pont; was soon "our general agent"; travelled all over the country on inspection trips; investigated delayed accounts; discharged untrustworthy agents; and was the one man whose advice on any subject was always welcome to General du Pont. He died in May, 1884, after a short illness that had not been considered alarming. There had been no time for readjustment and there was no one to take his place. The accustomed routine of transshipping and bookkeeping went on as before in the New York office, but the greater part of the work that Kneeland had accomplished was after his death done in General du Pont's office, and greatly increased his cares and the volume of

his correspondence. One of these letters is so characteristic as to be worth quoting. An agent in Texas had been somewhat over-zealous in warning the company of the laws concerning corporations; he was probably less officious after he had received the following reply in General du Pont's handwriting:

"We are a partnership — a firm composed of individuals. We are not an incorporated company, nor have we ever been a corporation. We have always been a firm and never had but the one firm name. We manage our own business in every particular, and allow no trusts or combinations to rule or dictate what we shall do or what we shall not do. We make our own powder, and we make our own prices at which it shall be sold, here, there, and everywhere in the world where it is for sale.

"We are every day dictating to our agents as to prices, terms, and conditions to govern them; but we do not allow anybody to dictate to us as to what prices, terms, and conditions we shall dictate. We do our own dictating.

"If we choose we can as quickly as wires can carry the orders change the price at each and every point in the world where Du Pont powder is for sale. And no trust, no combination,

no set of people nor persons can interfere. We have not changed our mode of selling. Our mode to-day is the same as it has been since our firm was established very nearly a hundred years ago and we expect to continue a hundred years more in the same way." [1]

In 1880 the Du Pont Company owned [2] "outside of the coal-fields: [3] the Brandywine mills; the Hazard Powder Company; the Sycamore Mills; [4] two thirds of the Oriental Powder Mills; [5] one third of the Austin Powder Mills; [6] thirteen twentieths of the California Powder Works." Henry du Pont kept in touch with the activities of all these plants and with four or five hundred agents. Lammot du Pont's resignation made it necessary that Eugene du Pont should superintend the Wapwallopen Mills, as

[1] Correspondence of E. I. du Pont de Nemours & Co., April 20, 1889.

[2] F. L. Kneeland to E. I. du Pont de Nemours & Co., September 14, 1880.

[3] *Inside* were Wapwallopen, and mills at Tamaqua, Pennsylvania, managed by H. C. Weldy. They became H. C. Weldy and Company in 1899.

[4] The Sycamore stock was acquired partly as payment for machinery, partly from individual holders.

[5] The Oriental Company was wrecked by a severe explosion of dynamite in 1870; became bankrupt with an indebtedness of $648,000; and was bought in 1879.

[6] The Austin Powder Company stock was bought in 1872.

well as the Upper Yard and the experimental laboratory. In 1884 Charles I. du Pont, a great-grandson of Victor, the brother of E. I. du Pont de Nemours, became assistant to Eugene du Pont, and Alfred I., a son of the second E. I. du Pont, helped Francis G. du Pont in Hagley and the Lower Yard.

The increasing demand for blasting powder in the Middle West and the difficulties of transportation made it necessary to build a factory to supply that market. In 1888 the Company bought land near Keokuk, Iowa, where Francis G. du Pont directed the construction of mills as perfect as his long experience could make them. They were not ready for work till April, 1890, but were then the largest mills in the world for the manufacture of blasting powder.

Before Lammot du Pont's retirement from the company some experimenting was done in the burning of charcoal. In 1876 it was found that "red charcoal has about 4 per cent more oxygen and hydrogen than light brown. Red charcoal ignites more readily than black." But nitro-glycerine was the absorbing subject of investigation, and until the Russo-Turkish War of 1877, in which England very nearly became involved, little thought was given to any

radical changes in munitions of war. In 1882 Captain Smith, of the Ordnance Department, asked the Du Pont Company to order moulds and dies to press "prismatic powder"; each cake was to be hexagonal in shape, to measure two and a half inches from flat to flat, and to be two inches high — a hole to be drilled through the middle.[1] In January, 1883, Eugene du Pont was arranging a temporary press for the "prismatic" and getting all the information he could about European powders.

Several of the "high explosive" formulas were largely composed of gun-cotton, which had been forgotten for nearly thirty years, and when it was definitely displaced by nitro-glycerine chemists began to experiment with it as a base for rifle powder. In June, 1883, Eugene du Pont went to Bridgeport to test samples of "E. C." powder that had been brought to this country by a Major Garrett who was authorized to sell the patent. The powder did not do what was expected of it, and Major Garrett's price was so high that the Du Pont Company declined to consider it. In 1884 the Company agreed to make samples of "Brown Prismatic

[1] Correspondence of E. I. du Pont de Nemours & Co., August 16, 1882.

or Cocoa Prismatic powder," and were working on a large press "moving slowly on a large number of prisms." [1] The chief difficulty in making the new powder seems to have been the proper burning of the charcoal — "we have not yet succeeded in getting charcoal in quantity of the desired amount of carbonization and of uniform quality"; [2] and three years later they were investigating the possibility of buying the "Danish process of preparing brown charcoal." [3] As a guide for incorporating the brown prismatic, for which the press was unaccountably delayed in the machine shops, some brown hexagonal was fired at Sandy Hook, and on March 30, 1885, two boxes of brown prismatic were sent to Communipaw "as ordered in letter from Ordnance Office, Washington, December 9, 1884, which says, 'as soon as your new press is in working order, please furnish us with a sample as nearly as possible like that described within, which was procured from the United Rhenish Westpha-

[1] Correspondence of E. I. du Pont de Nemours & Co., March 24, 1884.

[2] Correspondence of E. I. du Pont de Nemours & Co., July 7, 1884.

[3] Correspondence of E. I. du Pont de Nemours & Co., October 17, 1887.

lian Powder Co., for the 12″ B. L. Rifle.'" [1] The test of the new Du Pont powder was so satisfactory that Eugene du Pont immediately patented the formula. A year later the Rhenish Westphalian Company, through their London agent, offered to sell their formula for cocoa powder to the Du Pont Company, with the exclusive rights for the American market, but the Du Pont brown prismatic was satisfactory to the Government and the proposition was declined.

In March, 1889, the Chief of Ordnance wrote to the Du Pont Company that he had a report that the French Government was "making a new powder for the breech-loading rifles, 6″, 8″, 10″ calibre and larger, giving 2800 ft. per second velocity with 15 tons pressure, using about the weight of the projectile in powder"; [2] he desired that a competent person be sent at once to France to investigate. Alfred I. du Pont sailed immediately, instructed to learn as much as possible about both brown and smokeless powders for large guns and small arms in France and England, and to find out how many

[1] Correspondence of E. I. du Pont de Nemours & Co., March 30, 1885.

[2] Correspondence of E. I. du Pont de Nemours & Co., March 16 and May 24, 1889.

of the methods used in Europe might be purchased. The information gained by Mr. du Pont satisfied him that the reported success of the French brown prismatic was much exaggerated and the results no better than those of the Du Ponts' own formula. The secret of the French smokeless powder for small arms was so jealously guarded by the Government that while the officials showed him every courtesy he was not allowed to see the powder nor would they talk of it. From Paris Mr. du Pont went to England where he saw the agent of the Rhenish Westphalian Powder Company, of Cologne, and "learned that owing to certain encouragement given them by the United States Government, they were contemplating building mills in the United States";[1] and that their brown prismatic powder gave much the same results as the French. From England he went to Wetteren, in Belgium, where Coopal et C^ie^ made both prismatic powder and smokeless powder for small arms. In Mr. du Pont's opinion the Belgian powder was "superior to either the French or the Rhenish Westphalian powder."[2] He made tentative

[1] A. I. du Pont to E. I. du Pont de Nemours & Co., June 26, 1889. [2] *Ibid.*

terms with both firms and returned to America in June to give the company the details of his mission. Satisfied that the Du Pont brown prismatic was quite as good as that made in either Belgium or Germany, and that their experiments in smokeless powder would soon have a successful result, the members of the firm were not eager to pay a cash price and heavy royalties for the secret formulas of either company, but the Government insisted on the purchase and agreed to pay the royalties. Agreements were, therefore, made with both of the European companies in November, and Charles I. du Pont, who had worked with Eugene du Pont in his experiments with Government powders, went to Europe to learn the methods of manufacture.

Henry du Pont died on the 8th of August, 1889, after an illness of almost two months. For fifty-five years he had been a powder-maker, for thirty-nine of them the head of the firm. In the first years of his authority he made many important innovations in the business; he was an eager and skilful financier always; but as he grew older changes annoyed him. His father had built a little office between his house and the gate to the mills, and there with a staff

POWDER WAGON OF E. I. DU PONT DE NEMOURS & CO. (DISCONTINUED, 1889)

of four clerks and a boy General du Pont built up an enormous business of which he — and he only — knew every detail. He fought off the approach of railways as long as it was possible, and perhaps he was not alone in a little feeling of regret when in 1889 the teams of six mules with the big covered wagons were displaced by a branch of the Wilmington and Northern Railroad. The powder mills that often ran day and night and the roads between them were lighted, if that word may be used, by very inefficient lanterns, and it was only in response to a somewhat peremptory suggestion from the Chief of Ordnance that in 1889 an electric-light plant was installed. In 1884 an application was made that would have relieved General du Pont of at least a part of his work, but the answer was decisive, "We have no use for a stenographer and do not wish to employ any one in that capacity." [1]

It may have been partly the simplicity of his surroundings that appealed to the affection of the workmen. They could always find him in the little office, and he never refused to help or advise them when they came to him. Outsiders

[1] Correspondence of E. I. du Pont de Nemours & Co., February 12, 1884.

were a little afraid of the conservatism and decision of General du Pont's manner, but "the men" — the powder-men, the teamsters, the farmers — loved "Mr. Henry" and came to him with all their perplexities, confident of his wisdom and his friendship.

CHAPTER XI

1890–1902

EUGENE DU PONT and his brother, Francis G. du Pont, were the practical powder-men of the firm after Henry du Pont's death. Eugene, ten years older than his brother, became the senior partner. Colonel Henry A. du Pont continued the work that had been his under his father's management — apart from those duties his time was much occupied by the settlement of his father's estate. William du Pont resigned from the company, but continued to be president of the Repauno Chemical Company, the Hercules Powder Company, and the Hercules Torpedo Company until 1892, when he left active business. Three new members were added to the firm — Charles I. and Alfred I. du Pont, who for five years had been superintendents in the powder yards, and Alexis I., 2d, a brother of Eugene and Francis; he had been successful in other enterprises, but was persuaded to join his brothers who were inexperienced in business methods and somewhat dismayed at the task before them.

It was quite necessary to reorganize the management of the business; the changes began in the office. A larger building was at once planned, but work on it was delayed by an explosion in 1890 and it was not occupied until 1891. In this new office a reasonable number of clerks and stenographers were employed. The innumerable agencies were reduced to only eight or ten "branch offices" where powder was sold direct to the dealers. The staff of the New York office was materially reduced and the greater part of the work that had been done there was accomplished at the home office. The Philadelphia office was closed. A new wharf was built in the Delaware River at which vessels could discharge or receive cargoes and be directly met by freight cars.

In one way, however, and that a very important way, the firm's methods were unaltered. The business was entirely managed by the senior partner. It was customary for him to consult the other men in matters that concerned their departments of the industry, but he was in no way bound to accept their advice, and tradition made them hesitate to offer it or to ask questions. The head of the firm was *ex officio* head of the family. The homes of the

different partners belonged to the company, and it made any additions or improvements that were necessary and took no rental. For the first sixty years of its existence the individual partners did not even own horses; when a carriage was wanted a message was sent to the office and a vehicle of some sort usually arrived in due time — there were never any too many of them. Checks were cashed at the office and all mail went through the office and was usually sorted by the head of the firm himself. The houses were near together and the partners were men of very simple and domestic tastes, to whom it would never have occurred to want more money than was necessary for the needs of their quiet lives. No one of them ever thought of drawing his full income; they gave their allegiance to the Company and its chief and with it all their ability and confidence. It is not surprising that the accumulating profits grew very rapidly, nor that most of them were invested in the smaller powder mills that were constantly coming under the company's control. Since 1880 the company had bought Lammot du Pont's shares in the Repauno Chemical Company, the Hercules Powder Company, the Hecla Powder Company, and

the Hercules Torpedo Company; some shares in the Marcellus Powder Company, the Laflin Powder Manufacturing Company, and with Hazard and Laflin and Rand had organized the Standard Cartridge Company, which was founded because the older companies were making cartridges loaded with inferior powder. In addition to these interests the new Du Pont mills at Mooar, Iowa, were almost ready to furnish large quantities of blasting powder.

To offset this prosperity the losses suffered by the new firm in the first year of its existence were tremendous. At the very end of Henry du Pont's régime, in May, 1889, the building in the Upper Yard known as the "Refinery," where saltpetre and other raw materials were stored and refined, caught fire and was partly destroyed. Thanks to Eugene du Pont's control of the situation there were no fatalities, though the wooden building, with two hundred thousand pounds of saltpetre, was within a few yards of two large powder mills. The melted saltpetre, which cannot be fought with water, was running directly toward the mills when Mr. du Pont ordered that ditches should be dug to carry it into the Brandywine and himself led a party of men who drenched the

mills and the powder to protect them from the burning shingles of the Refinery.

In the same year there began a series of incendiary fires on the company's farms. In every case the fire was confined to the barn in which it began, but other buildings and even the mills were dangerously near. The first one was on December 26, 1889, then January 10, November 8 and 12, 1890, and the last one on November 12, 1893. The culprits were eventually found and imprisoned, but the unrest and tension that are caused by such a situation, particularly when it exists in the neighborhood of explosives, added infinitely to the difficulties of the new management.

In the middle of the afternoon of October 7, 1890, after seven years without a serious accident, the Upper Yard was torn to pieces by seven explosions occurring within eight seconds and consuming one hundred tons of powder; twelve persons were killed and twenty wounded. At first it was feared that the "barn-burners" were responsible for this horror, too; but there proved to be no doubt that in sealing a tin box of prismatic powder the soldering iron had been overheated and the powder exploded. The man who was doing the work evi-

dently saw what was about to happen in time to run several yards before the concussion killed him. Five of the Du Pont homes were badly shaken and many of the workmen's houses were destroyed; deep cavities showed where the mills had stood. The sympathy and offers of help that came by every mail did much to encourage the members of the firm. Eugene du Pont's answer to one of these letters shows his deep appreciation of the writer's generosity, and was the beginning of one of his very few intimate friendships:

To Schuyler Parsons, Esq.
New York City

October 10, 1890

Dear Sir: Our sorrows for the afflictions of the families of our workmen have been indeed lightened by such a manifestation of your sympathy as your letter of the ninth instant. Your kindness is written in our "book of remembrance," there to remain as evidence of your friendship. Concerning the losses and needs of all our hands — we purpose to them and their families and to all who have suffered, to bring out of chaos an orderly state of affairs, to restore everything except life to all; to nourish,

protect and guide all and to do everything possible for man to do. Such being our purpose it will not be necessary to use your check, which we therefore herein return with as many and as sincere thanks as it is possible for any one to give.

We remain very truly your friends

E. I. DU PONT DE NEMOURS AND CO.

As soon as Francis G. du Pont had started the Mooar Mills in Iowa, which began making powder in April, 1890, he devoted all his energy to the development of smokeless powder. Patent after patent was offered to the company. In 1883 they had refused to buy the formula for the "E. C." powder, chiefly because the samples did not give the promised results; but its quality improved and by 1892 it was a very important competitor. As a result of Alfred I. du Pont's investigations the formula used by Coopal et C^{ie} in Belgium was bought and Charles I. du Pont went to their factory to learn how it and the brown prismatic were made, but by the time he returned the Ordnance Department had found that Hudson Maxim's smokeless powder gave better results than Coopal's, although Maxim's powder gave

such high pressures that it was not considered satisfactory. Negotiations were immediately begun with Maxim, and samples from different European mills were sent for. Nobel developed a formula that the Company declined to purchase, the patent of which seemed likely to interfere with Maxim's. It was evident that none of the smokeless powder on the market was satisfactory, but the demand for such a powder was insistent.

Partly because the powder yards were already crowded with mills, partly because of the danger of having gun-cotton, the base of the new powder, near gunpowder mills, but chiefly for better shipping facilities, a large tract of land was bought at Carney's Point, on the Delaware River opposite Wilmington, and a wharf was built there in April, 1891. Experimental laboratories were constructed, and Francis G. du Pont, with the assistance at first of Pierre S. du Pont [1] and afterward Alexis I., 3d,[2] Francis I.,[3] and A. Felix du Pont,[3] worked indefatigably to develop a "Du Pont Smokeless." It was not till November, 1893, that they felt sufficiently sure of their formula to send

[1] Son of Lammot du Pont. [2] Son of Eugene du Pont.
[3] Son of Francis G. du Pont.

samples to the different cartridge factories for testing, though early in the summer they had "furnished twenty-five or thirty small cans to our friends, to get an opinion on the powder." [1] Six months later they had "radically changed the method of manufacture since last fall; put in new machinery and buildings. We are now making a very fine grade of powder — in every way better than the first. It is not yet on the market, because we desire to have a stock on hand before we begin to distribute it." [2] And soon after: "Our new smokeless powder is ready for the market, as yet only for shot guns; we have not yet adapted it for rifles or revolvers." [3] The following spring they were able to offer a bid for smokeless rifle powder, of which the Government wanted twenty thousand pounds.

The smokeless powder of that day had a new quality to recommend it. One is not apt to think of a color scheme in gunpowder, but a revulsion of feeling from the old black and the

[1] Correspondence of E. I. du Pont de Nemours & Co., August 19, 1893.

[2] Correspondence of E. I. du Pont de Nemours & Co., May 4, 1894.

[3] Correspondence of E. I. du Pont de Nemours & Co., June 22, 1894.

more recent brown powder seems to have run riot in the new manufacture: "We can dye the Smokeless almost any color desired. We send you a box of thirteen smokeless powders — all of these are on the market and you can judge of the colors. They are Giant; Walsrode; Robin Hood, made in Canada; E. C. powder; W. A., Laflin and Rand; Schultz; Austin; S. S., Hazard; Gold Dust, made in California and we think, in New York; King; Du Pont; Troisdorf. We also send you some small bottles of Du Pont powder dyed various colors. Some are very pretty. If you do not like any of them we can send others, as we have a multitude of shades." [1]

In 1896 the Navy Department ordered from the Du Pont Company one hundred thousand pounds of smokeless cannon powder to be made by the "Navy's own formula." It required both alcohol and ether, neither of which was used in the Du Pont powder. The Army and Navy never used the same powders — nor the same guns — and in time of war the difference of their requirements added not a little to the problems of the manufacturer.

[1] Correspondence of E. I. du Pont de Nemours & Co., June 3, 1896.

The agreements concerning brown prismatic and smokeless powder that were made in 1889 with the Belgian and German firms had almost expired in 1897, when a new competition threatened all manufacturers of explosives in the country. "The Rhenish Westphalian Gunpowder mills of Cologne propose to locate a branch of their works in New Jersey near New Brunswick. They have bought about five hundred acres. Mr. Barksdale [1] and Mr. Fay [2] sail to-day for Germany to see whether anything can be done as to a withdrawal from this enterprise. It would not be advisable to make any payment to head it off, and if anything is done it will be on a traffic agreement concerning dynamite." [3] Mr. Barksdale and Mr. Fay found that the matter could not be settled on a dynamite basis — smokeless powder had to be considered; and in July Bernard Peyton, of the California Powder Works, and Eugene du Pont went abroad to reënforce the American manufacturers. Mr. du Pont was at home again early in August with the outlines of an agreement that was completed in October, to be operative

[1] Of the Repauno Chemical Company.

[2] Of the Ætna Powder Company.

[3] Correspondence of E. I. du Pont de Nemours & Co., May 19, 1897.

till 1907, which effectually kept the largest German manufacturers out of the United States. The necessity of such an arrangement was explained in a letter from Eugene du Pont to Henry Belin written on December 30, 1897: "To give you briefly the history of the reasons why this agreement was made I would say that early in April about six hundred acres of land were purchased by the Europeans, near Jamesburg, New Jersey. Work was commenced with promptness, and sufficient buildings were erected to accommodate the manufacture of metallic blasting caps. So soon as we heard of this enterprise, after due consultation with other companies in interest, it was decided that some one had better go to Europe and see what the Europeans intended to do. Consequently Mr. Fay and Mr. Barksdale made the trip to Europe leaving New York on the 19th of May. After reaching Europe they had many interviews with the Europeans, and found that the latter were determined not only to manufacture blasting caps, but to extend their operations to all explosives; black powder, rifle and blasting, dynamite and smokeless powder. The Europeans were especially desirous of entering into the manufacture of rifle and blasting pow-

der, because smokeless powder in Europe had made great inroads on their sporting powder business; and the flameless explosives had practically driven the blasting powder out of the European markets. Their machinery, therefore, was standing idle, and they had intended to come to this country and put up blasting powder mills, not at the Jamesburg plant, but wherever the prices and delivery were such that they could run their mills at a profit. The anthracite region was no doubt considered by them, as well as every other large coal-producing centre.

"Messrs. Barksdale and Fay handled the negotiations as well as it was possible to do; and while some concessions were made, in the main they were compelled to accept the situation as they found it.

"By the agreement with the Europeans the danger of this competition was removed, and in order that the payments for preventing the competition should be made conveniently, it was decided that Smokeless Military Powder should be the basis on which the payment should be computed; and while smokeless military powder was thus used, it was only so because of convenience."

One wonders what effect such a system of factories as was planned by the Germans would have had on the history of the world in 1918 — or earlier.

When on April 25, 1898, the United States declared war with Spain the powder supply was in a very disorganized condition. It had been admitted in Washington that the Navy had not enough powder to suffice for two hours' hot engagement. The magazines were empty; not because of neglect, but because "prismatic powder had seen its day,"[1] and smokeless powder was improving rapidly, though as yet its keeping qualities were uncertain. In February the Government ordered two hundred thousand pounds of smokeless cannon powder; the largest guns required brown prismatic, of which one million pounds were ordered for the Navy early in July — to be delivered at the rate of twenty thousand pounds a day. The existing presses were insufficient, but a press had shortly before been invented by Alfred I. du Pont that turned out powder much more rapidly than the old ones; they were hurriedly installed and ran night and day. "The supply

[1] Correspondence of E. I. du Pont de Nemours & Co., January 23, 1899.

was equal to the demand and at no time was the Government crippled for want of this material." [1] Hardly was the work well under way when Cervera's fleet was "destroyed" and the order countermanded. The Du Pont and California Companies supplied all the prismatic powder that was used, but the Government had to "import some smokeless powder to suit the guns and ammunition of the New Orleans and other cruisers — bought in Europe." [2]

Brown prismatic powder was not made in any quantity after the Spanish War; but Eugene du Pont was mistaken in believing that "the smokeless military powder business has seen its maximum." [3] The Carney's Point capacity has grown steadily, and the powder has improved with the growth of the plant until Du Pont Smokeless, both for cannon and small arms, is believed to be the best ever produced.

For many years the Navy Department had a small powder plant at Newport, Rhode Island. At the close of the war they secured an appro-

[1] Correspondence of E. I. du Pont de Nemours & Co., January 23, 1899.

[2] Correspondence of E. I. du Pont de Nemours & Co., April 18, 1898.

[3] Correspondence of E. I. du Pont de Nemours & Co., May 28, 1900.

priation from Congress for the construction of a large smokeless powder plant at Indian Head, Maryland, where powder might be made by their own formulas, hoping to make it at less cost than the manufacturers' price. "The officers entrusted with its supervision visited our [the Du Pont Company's] several plants and asked for and received plans and blue-prints which would enable them to construct a plant with the greatest economy and of the greatest efficiency for the Government. When the appropriation was granted for the Army plant erected at Picatinny, New Jersey, we were requested by the Chief of Ordnance of the Army to assist them in the preparation of plans and, as a matter of fact, their engineers had access to our plants and their plans were sent to us for criticism and amendment. We furnished them with blue-prints for some of their work. All absolutely without compensation." [1]

Among those most interested in the development of smokeless powder was Captain Sidney Stuart, U.S.A., who was detailed to Wilmington to inspect Government powders. He was eager to try for himself certain experiments in shell-loading, which were quite apart from the

[1] Testimony of J. A. Haskell, March 10, 1910.

work of the Du Pont Mills, and for that purpose he had a small laboratory at Carney's Point. He and several workmen were killed in this building in April, 1899. Eugene du Pont wrote a very clear account of the unfortunate accident: "No one had any idea that compressing wet gun-cotton into a 13 in. shell would be attended with danger. The operation was as follows: The cavity of the shell, about 8 in. in diameter, was lined with thin copper. The conical head was filled with gun-cotton sawed from blocks to fit it. Two compressed blocks, full size of the cavity, were placed upon the gun-cotton sawed to fit the conical point. After that, loosely compressed gun-cotton containing seventy per cent of water was inserted in the end of the shell and forced home by hydraulic pressure. The pressure was ten thousand pounds per square inch and enough to reduce the soft blocks of gun-cotton to about two inches. The water flowed incessantly from the end of the shell as the gun-cotton was compressed. When the gun-cotton was fully compressed it contained at the least eighteen per cent of water. One shell had been loaded in the forenoon of Saturday, and the work on the second shell (which exploded) had proceeded

until about twenty pounds of gun-cotton had been placed therein under pressure. We have pressed very large quantities of gun-cotton in the regular shapes, and never had any accident of any kind." [1] In another letter he said: "It is a fact that all of the gun-cotton in the shell did not explode in the explosion which resulted in the loss of life of Captain Stuart and five other men. We found quite a large amount of this gun-cotton and no doubt some of it was scattered; the shell and casing were broken into very many fragments, some of them larger than others; the men standing around were badly cut to pieces." [2]

The amount of work involved in settling the estate of Henry du Pont brought to the firm a realization of the great volume of business that was being done by the company. Colonel du Pont advised that the partnership be made a corporation; the plan was much discussed and there was some opposition, but after various compromises were made the corporation was formed under the laws of Delaware on the 23d of October, 1899. Eugene du Pont became

[1] Correspondence of E. I. du Pont de Nemours & Co., May 2, 1899.

[2] Correspondence of E. I. du Pont de Nemours & Co., May 27, 1899.

president; his two brothers and Colonel du Pont, vice-presidents; and Charles I. du Pont, secretary and treasurer.

As a matter of fact there was no change in the administration of the business; directors' meetings were called, where the older men discussed affairs in the informal way that they had always done — the younger men were usually too busy to be present. Eugene du Pont was, as Henry du Pont had been, the one member of the Company who was in touch with all its workings — who wrote all the letters in any way concerning the policy of the business. Francis G. du Pont was fully occupied at Carney's Point and in keeping a general supervision of the different plants that had come under the company's control; his brother, Dr. Alexis I. du Pont, had a share in the administration of both the Du Pont Company and the Eastern Dynamite Company; Colonel du Pont's outside interests demanded the greater part of his time; and Charles and Alfred were trained only in the manufacture of powder.

In January, 1902, Eugene du Pont had a sudden attack of pneumonia and died on the 28th, after a week's illness. He had been in authority for eleven years, during which time the

business had grown rapidly, and the magnitude of the responsibility appalled the five men who, with Eugene du Pont's heirs, now owned it. Since Henry du Pont's death the Eastern Dynamite Company had been formed in 1895, by a coalition of the Repauno Chemical Company, the Hercules Powder Company, and the Atlantic Dynamite Company, and had bought the Dittmar Powder and Chemical Company. In that year large numbers of shares had been bought in the Enterprise Powder Company and the Chattanooga Powder Company. In 1896 the Phœnix Powder Company, the Southern Powder Company, the Chamberlin Cartridge and Target Company, and the Equitable Powder Company were added to the list. In 1897 some stock was bought in the American Ordnance Company, of Washington, D.C.; and the Maxim Powder and Torpedo Company, "buildings, machinery, and patents," was bought outright. In 1900 a large proportion of stock was bought in the Peyton Chemical Works; and in 1902 the Indiana Powder Company and the North Western Powder Company were bought. Some of these properties were owned by the Du Ponts alone; most of them were partly owned by the Laflin and Rand

Powder Company; and in some of them only a few shares were held by either company.

Colonel du Pont, Francis, and Alexis were in turn asked to take the presidency and each refused; Colonel du Pont, because his personal affairs required all his time; Alexis and Francis, because they were too ill to undertake new work — they both died in November, 1904. The two younger men, having no business training, were not considered eligible; the older of them, Charles I. du Pont, was moreover in very bad health and died before the end of the year. It was suggested that the presidency be offered to Hamilton M. Barksdale, who had been an official of the Repauno Company since 1887, and was a very able business man, but he declined to consider it "until they had exhausted all efforts to secure a man of the name to take the helm."

Francis G. du Pont was ill and despondent and could see no hope for the success of the company if it were handed over to the next generation; he advised that the business be sold outright, preferably to the Laflin and Rand Powder Company. To Alfred I. du Pont, however, it was intolerable that having reached so remarkable a position in the business world

the company should be sold to strangers because the fourth generation, of whom there were twenty young men and boys, was considered unable to carry on the industry that their great-grandfather had founded. He immediately offered to buy the business at whatever price might be considered just. Francis and Alexis du Pont hesitated because Alfred, though an experienced manufacturer, was not a business man, but Colonel du Pont gladly agreed to help formulate any reasonable plan that would keep the company in the hands of the family.

Alfred at once communicated with his two cousins, Thomas Coleman and Pierre Samuel du Pont, and asked them to help him to arrange for the purchase. Pierre S. du Pont had been with the company for nine years, first in the black powder mills, then as chemist in the smokeless powder laboratories, but had resigned in 1899 and had been living in Ohio, engaged in real estate and other administrative and financial business that served as an excellent preparation for his new responsibilities. Coleman du Pont was a man of varied business experience, with a remarkable ability for organization.

The value of the old company was the first subject for consideration. The members suggested a price of $12,000,000 which was tentatively agreed to; and on the 1st of March, just a month after the death of Eugene du Pont, the office was quite informally turned over to the new owners, of whom T. Coleman du Pont was president; Alfred I. du Pont, vice-president; Pierre S. du Pont, treasurer; and Charles I. du Pont, secretary. A month later an examination of the books of the company was completed and the value of $12,000,000 accepted. Payment was made in $12,000,000 four per cent notes and twenty-five per cent ($3,000,000) of the stock of a new corporation, E. I. du Pont de Nemours Company, afterwards changed to E. I. du Pont de Nemours and Company.

In 1802 E. I. du Pont de Nemours started to build his mills; in 1902 the fourth generation of his family began the second century of the industry that bore the name — his name — under which it had, as he hoped it would, "earned a reputation greater than that of others."

The hundredth anniversary of the settle-

ment of the Du Pont family in Delaware was celebrated on the Fourth of July, 1902; a little ahead of time, for it was on the 19th that Eleuthère Irénée du Pont and his family came to the log house that he had bought on the Brandywine. There were three thousand people at the fête, the Du Pont men with their families, the powder-men with theirs, and a few outside guests who were friends of long standing. There was dancing and target shooting, music and fireworks — merry-making of all kinds; but to the older powder-men, whether Du Ponts or not, there was some sadness. They were at the end of the old régime — the beginning of the new. In the task that was before them, and that they have so splendidly accomplished, it was impossible that the heads of the company should, like their fathers, work side by side with the men. They were in charge of great industries, not of a few powder mills, and they could no longer be the foremen of the yards — the friends and guardians of the individuals in their employ. The old homes in which Eleuthère Irénée du Pont and his son Alfred lived were too near the mills for safety, so greatly had the explosive force of powder increased. The "new office" was too small and

too far from town; a much larger one was rented in the Equitable Building in Wilmington. Saltpetre powder was no longer the most important of explosives, and the preservation of the Brandywine mills had become a matter of sentiment rather than of necessity.

A few days after the "Centennial Celebration" a committee of the employees of the mills met the members of the old and the new companies at the office in order to give a formal expression of their appreciation and affection; their resolutions were, in part:

"We, the employees of the E. I. du Pont de Nemours and Company, at the home works on the Brandywine, in meeting assembled have hereby resolved: That the record of one hundred years in the manufacture of Gunpowder made by the Du Pont Company as a family is also shared with pride by many of the employees whose fathers and grandfathers have been identified with the history of the works.

"*Resolved:* That as one generation after another passes away the record left by them has always been honesty, bravery and kindness from the Du Pont family and loyalty and love from their employees.

"*Resolved:* That we, the employees of the Firm in 1902, wish to record the fact that we appreciate the kindness shown to us by the present officials and members of the Du Pont family in thus inviting us all to mingle together in the celebration of this to them a Centennial Day and as we have loved and been faithful to their fathers we mean to do the same for the present generation."

At the end of the little ceremony, Pierre Gentieu, the spokesman of the Committee, said: "Gentlemen of the old Firm, who have been our leaders and friends for so many years, we are sorry that you are leaving us, for we will miss you." And turning to Coleman du Pont, "What the new Company will do of course we do not know, but let us hope that after one hundred years more as much good can be said of them as is said to-day of the Du Ponts for the past century."

THE END

APPENDIX

APPENDIX A

On the Manufacture of War and Sporting Powder in the United States

By E. I. du Pont
1801

(*Translated from the French*)

The high price of labor, and that of raw materials which is the natural consequence, have caused till now small success in the manufactures of the United States.

But a manufacture in which nearly all the work is done by machinery, which would use foreign raw material, and which for these reasons could not feel the effects of the high price of national industries, would be sure of complete success. It would also gain, to assure its profits, the cost of transportation and the commercial charges now paid by European manufacturers.

The manufacture of gunpowder has all these advantages; the cost of labor, even in America, is not one sixth of its price, and saltpetre, the only raw material in its composition of which the cost is important, comes from India at as low a price as is paid for it by European manufacturers.

A manufacture of this kind has therefore nothing to fear from the obstacles which will for a long time hinder the introduction of other manufactures into the United States. It can count on a high price and a sure market for its product. The supplying of the

Government for the Navy, for the Army, and for the Forts which are now nearly empty; the consumption of a race of hunters living largely in the forests; the commerce of the West Indies and that of the Indians offer to it outlets twenty times greater than would be necessary for the most brilliant success.

There are already in the United States two or three plants which make bad powder at great expense and which nevertheless do a good business. To give an idea of the incompetence of these manufacturers we will take as an example that plant which has the best reputation [1] which is now working for the Government.

The Philadelphia merchants who own this manufacture, nine years ago brought to this country as manager of their plant a Batavian workman who makes their powder as he saw it made in his own country — as they have probably made it in that Dutch Colony for fifty years.

They use saltpetre from India of an infinitely better quality than is procurable in France, but they refine it so badly, they use it while it is still so saturated with dampness and mother liquor, that even were their powder made by modern processes it would have about half the power of that made of dry, pure saltpetre.

They work four mills night and day, while with two mills, working in the daytime only, their output should be a quarter more than it is.

[1] Probably the mills at Frankford, Pennsylvania; owned by William Lane and Stephen Decatur.

They employ sixteen men; they would need but twelve to do as much work with two mills.

They grain their powder by crushing it in a wooden sieve or a kind of basket so badly arranged that the greater part is reduced to dust — increasing the cost of labor and the loss in manufacture.

This graining, so badly begun, they do not know how to finish, and they have not succeeded in making true Army powder even for the Government for which they work.

Such competitors should not be formidable to one who, having studied this manufacture for several years in the powder works of the French Government when they were directed by M. de Lavoisier, can add to the extensive knowledge of that administration the important modifications which have been in use since the Revolution and which have been caused in the making of powder by the needs of an unprecedented war.

We will make an approximate estimate of the annual cost and production of such an establishment in order to give an idea of the profit for which it would be reasonable to hope. But we will be careful in this calculation to keep the cost high and the profits at the lowest in order to be on the safe side.

We will take as a standard the prices existing in times of peace — that is to say, those existing before the present war; observing, however, that even when peace is reëstablished prices will not be so low as they formerly were — labor will be higher in Europe, whereas it may be somewhat lower in America.

We will look next into the circumstances which may aid in the success of this enterprise and the advantages offered it by the present needs of the Government.

A plant composed of only one stamping mill and one wheel mill gives an output of eight hundred pounds of powder a day, which, allowing only two hundred working days in a year, gives an annual output of 160,000 lbs.

Before the war, powder imported from Holland, very inferior in quality to the French powder, sold in America at Twenty-five dollars a quintal.

At this price 160,000 lbs. yield.....		$40,000
The cost of manufacture would be		
120,000 lbs. saltpetre @ 10¢ [1] ...	$12,000.00	
20,000 lbs. sulphur @ 2¢ [1]	400.00	
20,000 lbs. charcoal @ 1¢.....	200.00	
160,000 lbs.		
A head workman @ $1.75.....	638.75	
4 upper workmen @ $1.50 [2].....	2,190.00	
12 workmen @ $1.25.....	6,387.50	
Director's salary.....	2,000.00	
Loss in manufacture and incidentals [3].....	4,183.75	
Annual repairs to machinery....	2,000.00	$30,000
Profit.....		$10,000

[1] The price of saltpetre imported from India was before the war 6¢ a pound. That on 10¢ which we have here given for refined saltpetre is certainly exaggerated. The price of sulphur is in America $1.50 instead of $2.00 a quintal.

[2] The workmen are estimated here at 25¢ more than they are paid at the Philadelphia plant, where they work one night in three.

[3] The losses in manufacture are estimated at much too high

And in this estimate we give the same price to all powders, whereas in this quantity — 160,000 lbs. — there is always a proportion of choice powder [1] which sells at a much higher price and on which is the principal profit.

We have used as the base of our calculation the methods employed in France six years ago, since when there has been discovered a better and quicker process for the refining of saltpetre; a partly successful attempt has been made to substitute for the stamping mill a new method by which a better grade of powder is obtained in half the time and with fewer men. This new process may be already adopted — if a remedy has been found for the danger which it seemed to involve. There has recently been suggested in France a machine for graining powder by which one man can do the work of ten and which, moreover, markedly diminishes the loss in manufacture.[2]

a figure. The repairs would amount to almost nothing for the first years.

[1] *Poudre d'élite.*

[2] It should not be assumed that because the manufacture of powder has been perfected in France, the new discoveries will spread rapidly in the rest of Europe and that the manufacture to be established in the United States on the new methods would have no real advantage over others. The manufacture of powder in France scarcely suffices for the National demand and the economy introduced by the new methods will do no more than compensate them for the difference caused by the high price of saltpetre. The manufacturers of England and Holland having therefore nothing to fear from competition with French powder will make no effort to build new machinery; the more so because

It seems to us, then, quite proved that a powder manufacture established in America would have sufficient advantages even if after the present war the price should fall to its former rate.

But it is certain that one of the effects of this war will be a general increase in the price of labor in Europe and especially in Holland, because of the Revolution — and that in consequence imported powders will increase in value, which will be for the advantage of our enterprise.

The war has compelled the United States to develop a prudent strength, to build fortresses for the defence of her ports and her frontiers. The Government cannot depend on foreign countries to supply powder for the forts, for the artillery, for the Navy,

in manufacture exposed to such great risks one is slow to experiment. The horrible accident at the powder works at Grenoble will for a long time be a bugbear to those who would be tempted to imitate them and who have not sufficient knowledge to foresee results.

Except in France the manufacture of powder is left to private manufacturers. At the time of the war of 1764, the best powder was made by the English, and this superiority lasted long, but the Government of France having, under the ministry of M. Turgot, formed a school for the purpose and confided its administration to very capable men, the manufacture became so improved that the powder was superior to that made in all the rest of Europe and has continued so. Other countries have profited so little by the improvements made in France that, although for nearly twenty-five years French plants have been so constructed that in case of accidents the fire will not spread, this wise precaution is not copied and the new plant in Philadelphia is so arranged that if there were an explosion the whole plant would be lost.

it must have a manufacture established in America and will doubtless give all necessary encouragements to such an enterprise. The first of these should be a duty of 15 per cent on the importation of foreign powder, an assistance usually given in America to all kinds of manufacture.

From these facts we may calculate that the increase in the cost of labor in Europe and the duty on imports, of which we spoke, would raise the price of imported powder to at least 30¢ a pound instead of the 25¢ which it has been. This small increase would give an annual profit of $20,000.

If the Naval war continues or is renewed, the profits of the enterprise would be infinitely greater. The price of powder in the United States in times of war is from 50¢ to 75¢ a pound. The Government is now paying 47¢.

Taking as example this last, and lowest price — the 160,000 lbs. of powder would yield.....		$75,000
The cost of manufacture would be		
120,000 lbs. saltpetre @ 20¢ (because of the war)	$24,000.00	
Sulphur and charcoal.....	600.00	
Labor.....	9,216.25	
Director's salary.....	2,000.00	
Losses in manufacture.....	7,183.75	
Annual repairs.....	2,000.00	45,000
Profit.....		$30,000

In order to simplify these calculations we have considered only the output of a single unit of mills, although most of the old plants have two or three; the needs of the Government and those of com-

merce offer boundless opportunities to such an enterprise and it would be possible to double or triple the output by the construction of one or two new units.

The equipment of the forts alone requires two million pounds of powder. The Government, by the frigates which it has sent to India, has assured the necessary supply of saltpetre, of which it now has 800,000 lbs.

The manufacture of these two million pounds of powder would be sufficient reason for the establishment of a new manufacture, even if it were to have no other market, since this quantity would employ a plant of two units for several years and would alone, by the lowest possible estimate, assure a profit of more than $125,000.

APPENDIX B

(Translated from the French)

ARTICLES of Incorporation for the Establishment of a Manufacture of military and sporting powder in the United States of America.

The undersigned Du Pont de Nemours, Père et Fils et C^ie^ of New York — Bidermann — Catoire, Duquesnoy et C^ie^ — and Eleuthère Irénée du Pont, intending to establish a manufacture of military and sporting powder in the United States of America, have formed a Corporation for that establishment and have drawn up the following articles:

ARTICLE 1

The capital of the Company shall be thirty-six thousand dollars, in eighteen shares of two thousand dollars each.

ARTICLE 2

The capital will be subscribed by

Bidermann for one share	*one share*
Catoire, Duquesnoy et Comp	*one share*
Necker — Germany	*one share*
Arch^d^ McCall	*one share*
	one share
Peter Bauduy	*one share*
	one share
Du Pont de Nemours Père et fils et C^ie^ of New York	*twelve shares*

ARTICLE 3

Each share shall pay an interest of six per cent.

ARTICLE 4

Citizen E. I. du Pont is entrusted with the construction of the mills and the management of the business, he will give to it his whole attention for which he will be allowed a yearly salary of eighteen hundred dollars.

ARTICLE 5

The constructions necessary for the manufacture shall be completed during the year 1801 and the first months of the following year, so that the mill may be in operation in the spring of 1802.

ARTICLE 6

There shall be made every year, beginning at the end of December, 1803, an Inventory giving the value of the property and the product at the market price. Any sum in excess of the original capital shall, after the interests have been paid, be considered profit. The Company Du Pont de Nemours Père et Fils et C^ie^ of New York, the principal shareholder, shall instruct one of its members or an accredited representative to assist at the making of this Inventory.

ARTICLE 7

The profits or losses, should there be any, shall be divided in the following proportions: Eighteen

parts to the shareholders, nine to the director of the business, as his share in the industry that he is to establish, and three to [1] one of the originators of the plan for this manufacture.

ARTICLE 8

If it should be unnecessary to dispose of the three shares as indicated in the preceding article, they shall be suppressed.

ARTICLE 9

The Director of the manufacture and the representative of the Company Du Pont de Nemours Père et fils et Cie shall decide each year after making the Inventory, what proportion of the profits shall be divided among the shareholders.

ARTICLE 10

For those shareholders who live in France, the interest and dividends will be paid in Paris by whatever firm corresponds with Du Pont de Nemours Père et Fils et Cie of New York.

ARTICLE 11

The Director of the manufacture shall keep his books by the same methods as those established in France by the Administration des Poudres et Salpetres.

ARTICLE 12

In the event of the death of the Director, the Company Du Pont de Nemours Père et Fils et

[1] Col. Toussard.

C^ie^ is authorized to settle his interests in the manufacture, and to name his successor; and to supervise such adjustments as may be necessary under any circumstances that have not been provided for in this agreement.

ARTICLE 13

The Corporation formed by this agreement shall cease to exist after the first of January, 1810.

ARTICLE 14

Each of the shareholders shall declare before the first of January, 1809, whether he wishes to continue the Corporation or to retire.

ARTICLE 15

If two thirds or more of the shareholders agree to renew the Corporation, those who do not wish to continue shall be reimbursed for their share of the capital and profits in accordance with the Inventory of December 31, 1809; the payments to be made in three equal parts, at three, six and nine months from the date of their resignation from the Corporation, with interest at six per cent.

ARTICLE 16

If two thirds of the shareholders refuse to continue, Citizen E. I. du Pont shall arrange the liquidation of the Corporation in accordance with the stipulations in the preceding Article.

ARTICLE 17

In the event provided for by Articles 15 and 16, the Inventory of the manufacture for December 31, 1809, shall be made by experts chosen by the two thirds who shall if necessary select one of their number as arbitrator.

ARTICLE 18 AND LAST

The present Articles of Incorporation shall be a binding agreement with each of the shareholders, and therefore a certified copy shall be given to each one of them.

Paris, 1 *Floréal, year* 9. *April* 21, 1801.

(*Signed*) DU PONT DE NEMOURS FATHER, SONS & CO. CATOIRE, DUQUESNOY ET COMP. — ARCHD MCCALL — BIDERMANN — PETER BAUDUY — E. I. DU PONT.

Memorandum. — Since the signing of the above agreement Mr. Peter Bauduy has purchased the two shares subscribed for by Mr. Archd McCall.

Philadelphia, May 4, 1808.

(*Signed*) E. I. DU PONT

This present copy has been carefully examined and compared by me, Pierre Étienne Du Ponceau, notary public for the Republic of Pennyslvania, duly admitted and authorized, a resident of Philadelphia, undersigned, with the original document brought to me by Mr. E. I. du Pont in order that

this copy should be made, and by me returned to him, as agreed.

Done at Philadelphia, May 4, 1808

(*seal*) PETER S. DU PONCEAU
not. pub.

Authentication.

OFFICE OF THE CONSUL-GENERAL OF FRANCE TO THE UNITED STATES

We, Louis-Auguste-Felix de Beaujour, Member of the Legion of Honor, Consul-General of France to the United States; Certify that the signature affixed to the above document with the seal of office of the Consul-General is that of Mr. Peter S. Du Ponceau, notary public in this city of Philadelphia, and that full confidence may be given it in litigation or otherwise.

In testimony of which we have executed these presents.

Philadelphia, May 6, 1808

(*seal*) (*Signed*) BEAUJOUR

APPENDIX C

Statement by P. S. du Pont de Nemours
April 18, 1808

Names of the present shareholders in the company formed under the management of Du Pont (de Nemours) Père et Fils et Compagnie, and the number of their shares in that Company.

Number of shares and parts of shares to be given them in the Manufacture of Powder lately established at Eleutherian Mill, State of Delaware.

Shareholders	*Shares*	*Parts of shares*	*⅓ shares*	*⅙ share*	
M. Bidermann.....	13	..	4	1	
M. Johannot.....	5	..	1	2	
Mme. de Pusy.....	5	..	1	2	
Du Pont de Nemours.	3	..	1	..	
Mme. de Staël.....	2	..	..	2	1
M. de Crillon.....	1	½	..	1	
Mme. du Pont (de N.)	1	..	..	1	
M. Lescalier.....	1	..	..	1	
M. Ochs and children	1	..	..	1	
M. Wischer.....	1	..	..	1	
M. Forcard Weiss....	1	..	..	1	
M. Reinhard.....	1	..	..	1	
M. Hom.....	..	½	..	..	1
	36		12		

APPENDIX D

(*E. I. du Pont's Manuscript*)

January 29, 1831

Decomposition of Nitrate of Soda by Potash

The Peruvian Saltpetre, or nitrate of soda, on which our experiments have been made, is nearly pure, not containing over 2 per cent of marine salt and other impurities.

Pure nitrate of soda contains 63 parts of nitric acid, and $\frac{37}{100}$ of soda

The componants parts of nitrate of Potash or saltpetre, are 51 of nitric acid
49 of Potash
100

from these proportions it results that in decomposing nitrate of soda by potash, it would take 62 parts of pure Potash to combine with 63 parts of nitric acid p^{r} hundred pounds of nitrate of soda, which would produce 125 pounds of pure saltpetre. In our experiments the saltpetre has exceeded 124 lb. and would no doubt come nearly to 125 lbs. in operating on large quantities.

The common Potash in the market does not contain over 80 p^{r} cent of pure Potash, it would consequently require nearly 78 lb. of common Potash to furnish the 62 lb. wanted p^{r} hundred pounds of nitrate of soda. In our experiments we have used upwards of 80, but we had an excess of Potash.

The 37 parts of soda if combined with carbonic acid would take 25 parts of acid and in chrystallising would absorb 115 parts of water, which would furnish 177 pounds of chrystallised carbonate of soda. this would be the case if the Potash would furnish only carbonic acid, but the common Potash contains about 7 p^{r} cent of Sulphuric acid, say 5½ for the 78 lb of Potash, which 5½ pounds uniting with 5 pounds of soda gives 10½ pounds of dry sulphate of soda and reduces the chrystallised carbonate of soda to 154 lb.; but we have allowed only 128 lb. because there is also a small proportion of Hydrochloric acid both in the Potash and in the nitrate of soda, and because when the mother waters should become thick and durty it would be best to evaporate them, calcinate the proceeds and sell it as dry soda, than to push the operations any further with the view of obtaining the whole in chrystallised carbonate of soda.

The calcinated soda will proceed from 5 lb. combined with Sulphuric acid, 5 pounds remaining in the mother waters; and from earthy matters and impurities, and would exceed the 12lb. p^{r} cent of nitrate of soda which have been calculated upon.

The quantity of Chrystallised Carbonate of soda which is yearly imported is about 200 casks, say 120,000 lb., which sells at 5 to 6 cents, we suppose that 128,000 lb could sell at 4 cents.

If the operation was extended to more than 100,000 lb. of nitrate of soda, the quantity of soda exceeding 128 lb. of chrystallised carbonate would have to be sold in a dry state, say 62 lb. of dry car-

bonate of soda p^{r} hundred pounds, of which deducting 12 lb. for what will be extracted of the mother waters, leaves 50 lb. of dry carbonate of soda; we say 52 as it would not be made perfectly dry; we have estimated it at 5 cents, it being worth more than Potash for Glass or soap manufacturers.

The 12 lb. of calcinated soda extracted of the sulphate of soda and mother waters, would be a great deal purer than the common Barrilla, and on this account has been estimated at 3 cents p^{r} pound.

Operation on 100,000 lb. of Nitrate of Soda

100,000 lbs nitrate of soda @ 5 ¢	$5000	124,000 lb. saltpetre @ 7 ¢	$8680
80,000 " Potash @ 5–10	4080	128,000 " carb. of soda @ 4	5112
Labour, fuel, wear & tear	1000	12,000 " calcined soda @ 3	360
	$10,000		$14,152

on 600,000 lb.

600,000 lb nitrate of soda @ 5 ¢	$30,000	744,000 lb	saltpetre @ 7 ¢	$52,080
480,000 Potash @ 5–10	24,480	128,000	carb. soda @ 4	5 112
Labour fuel, wear & tear	4 500	260,000	dry soda pure @ 5	13,000
		72,000	calcined soda @ 3	2 160
	$58,980			$72,352

APPENDIX E

E. I. du Pont to Hezekiah Niles, Editor *Niles' Weekly Register*, Baltimore

August 29, 1827

The amount of Gunpowder manufactured at du Pont's mills near Wilmington Delaware has been of late years from 6 to 700,000 lbs. with the new mills lately added to the establishment the quantity manufactured this year will be upwards of 800,000 lbs.

The raw material annually imported for manufacturing this quantity of Gunpowder are 712,000 lbs. of crude saltpetre imported from the East Indies, and 94,000 lbs. of Brimstone from france or Italy.

The number of persons employed at the factory are

Overseers, clerks and workmen	99
Blacksmiths	3
Mill wrights	8
Carpenters	6
Masons	5
	121
to which are to be added Coopers for making kegs	17
Tin-men for canisters	2
	140

and also Waggoners, Shallop men, &c., &c.

The whole amount of pounds of Gunpowder manufactured at du Pont's mills since their first establishment in 1803 up to the 1st of June, 1827,

has been 9,718,438 lbs. When this manufacture was first erected the greatest part of the gunpowder consumed in the United States was imported from England. Had the above quantity continued to be imported, the average cost in England would not have been less than 21 cents pr. pound; so that this establishment alone has already saved to the nation upwards of two millions of dollars, which have been kept at home to circulate among ourselves, instead of being paid as a tribute to European industry.

The encouragement afforded by the last war, had upon Gunpowder manufacturers the same effect as protecting duties would have upon all other branches of National Industry; Large Capitals were involved, and a competition created which not only forced the manufacturers to improve in their art but at the same time reduced the price of the article very considerably. the cost of Imported Gunpowder of a good quality, without any profit to the merchant, is at present from 26 to 30 cents per pound, while american powder of the same kind sells at 16 & 20. if the american manufactures had not been encouraged there would still be a few in the country and the importers would still have it in their power to fix the price in the market, which with a reasonable profit to themselves could not now be less than 32 to 36 cents per pound; previous to the last war the regular price was 40 cents, — so that the encouragement given and the competition created, united with the enterprise and skill of the American manufacturers have reduced the price of the article to be forever cheaper than it can be imported.

It is however to be observed that the government by allowing the drawback of duties upon Imported powder encourages the importation of inferior and of damaged Gunpowder, which as it could not sell in Europe continues to be imported here to be re-exported to South america, and thus contribute in part to the supply of a market which otherwise would be furnished by the produce of our own manufacturers.

It ought also to be noticed that the importation of Crude Saltpetre, one of the principal raw materials for the manufacture of Gunpowder, is taxed with a duty of 15 p^{r} c$^{t.}$ Saltpetre is not manufactured in this country in time of peace, and should not if it could as it is of great importance to keep for time of war all that the country may contain. The duty on crude saltpetre acts consequently only as a tax on Industry and as an obstacle for the american manufacturer to meet foreign competition in foreign markets. Crude saltpetre ought to be imported free of duty as it was formerly, but the tariff of 1816 subjected it to a duty of 7½ pr. ct. which in 1826 was increased to 15 pr. ct. The duty of 3 cents pr. lb. on refined saltpetre which was laid by the tariff of 1824 acts on the contrary as an encouragement to Industry, and has already had the good effect of every other encouragement on domestic manufactures. There are now several large establishments for refining saltpetre and the price which had never been previous to the duty less than 10 cents pr. lb. is now reduced to 7½ pr. pound.

APPENDIX F

Henry du Pont to Amos C. Brinton, Wilmington

January 7, 1884

E. I. du Pont de Nemours and Co. started their powder works on the Brandywine in 1802, — the Upper works, on the site of the first Cotton mill ever built in the United States, which was destroyed by fire some time before our people came to Delaware. In Brooks [1] history of cotton manufacture of the United States it is claimed that the first mill was built at Providence, R.I. This is not the case, for the parties who built the Providence mill came to Delaware to see this Cotton mill on the Brandywine before commencing theirs. They brought a letter of introduction to Mr. Canby, and I understand that Mr. James Canby brought them out to see the mill.

The Woolen mill opposite the Upper Powder works was started by Victor du Pont in 1806. The Hagley Powder works were established by E. I. du Pont de Nemours and Co. in 1812, on the site of the old Iron and slitting mill of Rumford Dawes. The Henry Clay Factory was built in 1815. The Rokeby mill was built by Louis McLane and George B. Milligan, I cannot say in what year, but our Company bought that property and the site opposite, occupied by Simmes, from Louis McLane and

[1] Probably Brooks. Illegible in the manuscript.

George B. Milligan in 1813. The Lower Powder works in Brandywine Hundred were built on our unoccupied water power in 1847. The Simmes and Rokeby mills were erected for cotton mills.

APPENDIX G

E. I. du Pont de Nemours and Company
1802–1902

	Partners	Superintendents
1802	E. I. du Pont	
	Peter Bauduy — resigned 1815	
1815	E. I. du Pont — 1834	Alfred V. du Pont
	Antoine Bidermann	Henry du Pont
1834	Antoine Bidermann — resigned 1837	Alexis I. du Pont
	Alfred Victor du Pont	
1837	Alfred V. du Pont — resigned 1850	E. I. du Pont, 2d
	Henry du Pont	Lammot du Pont
	Alexis Irénée du Pont	
1851	Henry du Pont	
	Alexis I. du Pont	
	Eleuthère Irénée du Pont, 2d	
1857	Henry du Pont	Eugene du Pont
	Alexis I. du Pont — killed 1857	
	E. I. du Pont, 2d	
	Lammot du Pont	
1863	Henry du Pont	F. G. du Pont
	E. I. du Pont, 2d	
	Lammot du Pont	
	Eugene du Pont	
1874	Henry du Pont	(Col.) H. A. du Pont
	E. I. du Pont, 2d — died 1877	William du Pont
	Lammot du Pont	

Eugene du Pont
Francis G. du Pont

1878 Henry du Pont
Lammot du Pont — resigned 1882
Eugene du Pont
Francis G. du Pont
Henry A. du Pont
William du Pont

1882 Henry du Pont — died 1889 — Charles I. du Pont
Eugene du Pont — Alfred I. du Pont
Francis G. du Pont
Henry A. du Pont
William du Pont — resigned 1889

1889 Eugene du Pont — Pierre S. du Pont from 1890 till 1899
Francis G. du Pont — Henry Belin du Pont — died 1902
Henry A. du Pont — Alexis I. du Pont, 3d
Alexis I. du Pont, 2d — Eugene du Pont, Jr.
Charles Irénée du Pont — Francis I. du Pont
Alfred Irénée du Pont — A. Felix du Pont

1889 The partnership dissolved and a corporation formed.

STOCKHOLDERS

Eugene du Pont, President — died 1902
Francis G. du Pont, Vice-President
Henry A. du Pont, Vice-President
Alexis I. du Pont, Vice-President
Charles I. du Pont, Secretary and Treasurer
Alfred I. du Pont

APPENDIX II

Prices of Saltpetre in the United States

1804	.20 per lb.	Calcutta, crude.	
1805	.20 & 21	" "	
1806	.18	" "	
1807	.16	" "	
1808	.24–.30	" "	American ports closed to British ships.
1809	.30–.38	Kentucky & Tenn.	
1810	.30–.36	" "	
1811	.30	" "	
1812	.30–.33	" "	War with Great Britain
		(Mammoth Cave)	
1813	.32–.38	" "	
1814	.32–.38	" "	Treaty of peace at Ghent.
1815	.25	Calcutta, crude	
1816	.15–.18	" "	Duty of 7½% imposed.
1817	.10–.16	" "	
1818	.10	" "	
1819	.08–.10	" "	
1820	.07–.08	" "	
1821	.06½–.07	" "	
1822	.06½–.07	" "	
1823	.06½–.07	" "	
1824	.06½	" "	
1825	.06½	" "	
1826	.05–.05¾	" "	Duty of 15% imposed.
1827	.05½–.06¾	" "	

1828	.07–.07½	Calcutta,	crude	
1829	.07¼–.07¾	"	"	
1830	.07–.07¼	"	"	
1831	.08–.10–.07½	"	"	Rumors of European war.
1832	.07½	"	"	
1833	.06¾	"	"	
1834	.06¾	"	"	
1835	.06	"	"	
1836	.05½–.06½	"	"	
1837	.06¾–.06	"	"	Peruvian saltpetre — nitrate of soda, .04.
1838	.05½	"	"	
1839	.06½–.08¼	"	"	
1840	.05¾–.06½	"	"	
1841	.06½	"	"	
1842	.05¾	"	"	
1843	.05¼–.06	"	"	
1844	.06½–.07⅞	"	"	
1845	.06¼–.05½	"	"	
1846	.06–.05¾	"	"	
1847	.06–.05½	"	"	
1848	.06⅜–.06⅜	"	"	
1849	.05½–.06	"	"	
1850	.05¾	"	"	
1851	.05¼–.07½	"	"	
1852	.06⅜–.05½	"	"	
1853	.06½–.07½	"	"	Nitrate of soda .05.
1854	.06¼–.08	"	"	
1855	.06¾–.20–.16½	"	"	Crimean War.
1856	.15–.07½–.09	"	"	
1857	.07½–.12–.07	"	"	Indian Mutiny.
1858	.06½–.09	"	"	
1859	.07⅞–.11½–.07½	"	"	European war May to August.
1860	.08¼–.11⅜	"	"	
1861	.08½–.17–.12	"	"	Civil War in United States.

1862	.12–.15	Calcutta, crude	Nitrate of soda .03–.06.
1863	.16–.17	" "	Manufactured saltpetre .17½.
1864	.16–.25½	" "	Nitrate of soda .07½.
1865	.23–.12½	" "	End of Civil War.
1866	.10	" "	
1867	.09–.10	" "	Nitrate of soda .03½
1868	.07–.07½	" "	
1869	.07½ (gold)		Gold at 150 "and upward."
1870	.08–.09 (gold)		Franco-Prussian War.
1871	.08¾–.07¾ (gold)		Nitrate of soda .02⅞ (gold).
1872	.06½–.09–.06	"	Duty reduced to .01 per lb.
1873	.07½	"	
1874	.06–.05¼	"	Nitrate of soda .02⅞.
1875	.05½	"	
1876	.05–.07½	"	Manufactured saltpetre .08.
1877	.06½–.08–.05	"	Nitrate of soda .03. Tidal wave destroys storehouses in Chili.
1878	.06¼	"	Nitrate of soda .03¾.
1879	.07½–.05–.06½	"	Gold at par. Peru and Chili at war. Nitrate .03½–.04½.
1880	.07		
1881	.05¼		Nitrate of soda .03⅜.
1882	.05½–.05¾		Nitrate of soda .02½.
1883	.04⅞–.05⅜		
1884	.04¾–.05½		Nitrate of soda .02.
1885	.04½–.05		
1886	.04½		
1887	.05		Nitrate of soda .01⅞.

1888 .04–.05¼

1889 .05¼–.04 7/16 — Duty taken off saltpetre.

1890 .04 1/16

1891 .03½ — Nitrate of soda. .01⅝–.02 1/16.

1892 .0⅜ — " " " .01 7/16.

1893 .03⅜ — " " " .01¾.

1894 .03¾ — " " " .02.

1895 .04 — " " " .01¾.

1896 .03 7/16–.02 9/16 (lowest) — " " " .01¾.

1897 Du Pont Co. m'f'g saltpetre — " " " .01¾.

1898 .03¼–.03 — " " " .01⅝.

1899 .03½–.03 1/16 — " " " .01½.

1900 Du Pont Co. buying large quantities of muriate of potash for the manufacture of saltpetre from nitrate of soda "because saltpetre is advancing." Transvaal War.

1901 .03¼.

1902 .03⅕–.03 9/16.

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